# Relion 1903GT

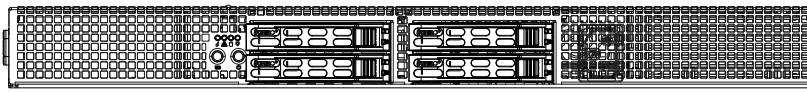
Technical Guide
Rev. 1.0

PENGUIN COMPUTING

SUPERMICRO®

# SUPERSERVER®

# 1028GR-TR
# 1028GR-TRT



# USER'S MANUAL

Revision 1.0

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Manual Revision 1.0
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# Preface

## About this Manual

This manual is written for professional system integrators and PC technicians. It provides information for the installation and use of the SuperServer 1028GR-TR/TRT. Installation and maintainance should be performed by experienced technicians only.

Please refer to the server specifications page on our Web site for updates on supported memory, processors and operating systems (http://www.supermicro.com).

## Notes

For your system to work properly, please follow the links below to download all necessary drivers/utilities and the user's manual for your server.

- Supermicro product manuals: http://www.supermicro.com/support/manuals/
- Product drivers and utilities: ftp://ftp.supermicro.com
- Product safety info: http://super-dev/about/policies/safety_information.cfm

If you have any questions, please contact our support team at:
support@supermicro.com

This manual may be periodically updated without notice. Please check the Supermicro Web site for possible updates to the manual revision level.

## Warnings

Special attention should be given to the following symbols used in this manual.

**Warning!** Indicates important information given to prevent equipment/property damage or personal injury.

**Warning!** Indicates high voltage may be encountered when performing a procedure.

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# Chapter 1

# Introduction

## 1-1 Overview

The SuperServer 1028GR-TR/TRT series is a GPU/Xeon Phi optimized server comprised of two main subsystems: the SC118GH-R1K66B 1U server chassis and the X10DRG-H/HT serverboard. The 1028GR-TR offers 1Gb LAN connections and the 1028GR-TRT offers 10Gb. Refer to our web site for information on operating systems that have been certified for use with the system (www.supermicro.com). Additional components are:

- Ten 4-cm counter-rotating fans (FAN-0141L4)
- One air shroud (MCP-310-11803-0N)
- Two passive CPU heatsinks (SNK-P0047PS:CPU1 and SNK-P0047PSC:CPU2)
- Riser Cards
  - One RSC-R1UG-A2E16-X9
  - One RSC-R1UG-E16R-X9
  - One RSC-R1UG-E16AR+II
  - One RSC-R1UG-E16R+II
- Three power cables for GPU cards (CBL-PWEX-0582)
- SATA Accessories
  One SAS backplane (BPN-SAS-118G-4)
  Four hot-swap drive carriers (MCP-220-00047-0B)
  Four SATA cables (CBL-0484L)
  One SGPIO cable (CBL-0157L-02)
  One backplane power ext. (CBL-0460L)
  Five fan extension cables (CBL-0296L)
- One rail set (MCP-290-00054-0N)

**Note:** For your system to work properly, please follow the links below to download all necessary drivers/utilities and the user's manual for your server.

- Product manuals: http://www.supermicro.com/support/manuals/
- Product drivers and utilities: ftp://ftp.supermicro.com
- Product safety information:
  http://super-dev/about/policies/safety_information.cfm

For support, email support@supermicro.com.

## 1-2 Serverboard Features

At the heart of the server is the X10DRG-H/HT, a dual processor serverboard based on the Intel PCH C612 chipset. Below are the main features. (See Figure 1-1 for a block diagram)

### Processors

The X10DRG-H/HT supports two Intel E5-2600v3 series processors in LGA 2011 sockets (Socket R3). Refer to the serverboard description pages on our web site for a complete listing of supported processors (www.supermicro.com).

### Memory

The serverboard has 16 DIMM slots that can support up to 1TB of registered (RDIMM)/Load Reduced (LRDIMM) DDR4 ECC 2133/1866/1600 MHz RDIMMs. See Chapter 5 for details.

### Serial ATA

The serverboard supports a 10-port SATA 3.0 subsystem. RAID 0, 1, 5 and 10 can be enabled. The SATA drives are hot-swappable.

### PCI Expansion Slots

The serverboard has four PCI-Express 3.0 x16 slots to support three double-width GPU cards. An additional slot supports one low profile PCI-Express 3.0 x8 (in x16 slot) card. Note that both CPUs must be installed for full use of the PCIe slots.

### Input/Output Ports

The rear I/O ports include a VGA (monitor) port, two USB 3.0 ports, two Ethernet LAN ports (1Gb for X10DRG-H, 10Gb for X10DRG-HT) and one dedicated IPMI LAN port.

### IPMI

IPMI (Intelligent Platform Management Interface) is a hardware-level interface specification that provides remote access, monitoring and administration for Supermicro server platforms. IPMI allows server administrators to view a server's hardware status remotely, receive an alarm automatically if a failure occurs, and power cycle a system that is non-responsive.

## 1-3 Server Chassis Features

### System Power

The SC118GH-R1K66B features a high-efficiency 1600W redundant power supply. One power module may be removed without shutting down the system. See Chapter 6 for details.

### SATA Subsystem

The chassis includes four 2.5" drive bays, which may be used to house hot-swappable SATA drives. RAID 0, 1, 5 and 10 are supported (RAID 5 is not supported with Linux OS).

### Front Control Panel

The control panel provides a system monitoring and control interface. LEDs indicate system power, HDD activity, network activity, system overheat, UID and power supply failure. A main power button and a system reset button are also included.

### Cooling System

The system has an innovative cooling design that includes ten 4-cm counter-rotating PWM (Pulse Width Modulated) fans. The power supply module also includes a cooling fan. All chassis and power supply fans operate continuously.

## 1-4 GPU Subsystem

The 1028GR-TR/TRT server represents one of Supermicro's massively parallel processing multiple-GPU/Xeon Phi servers, with support for up to three GPU/Xeon Phi cards. It supports all NVIDIA K10, K20, K40, K80 GPUs and Intel Xeon Phi cards, placing this system at the forefront of today's GPU computing solutions.

Refer to the NVIDIA web site (www.nvidia.com) for details on GPUs.

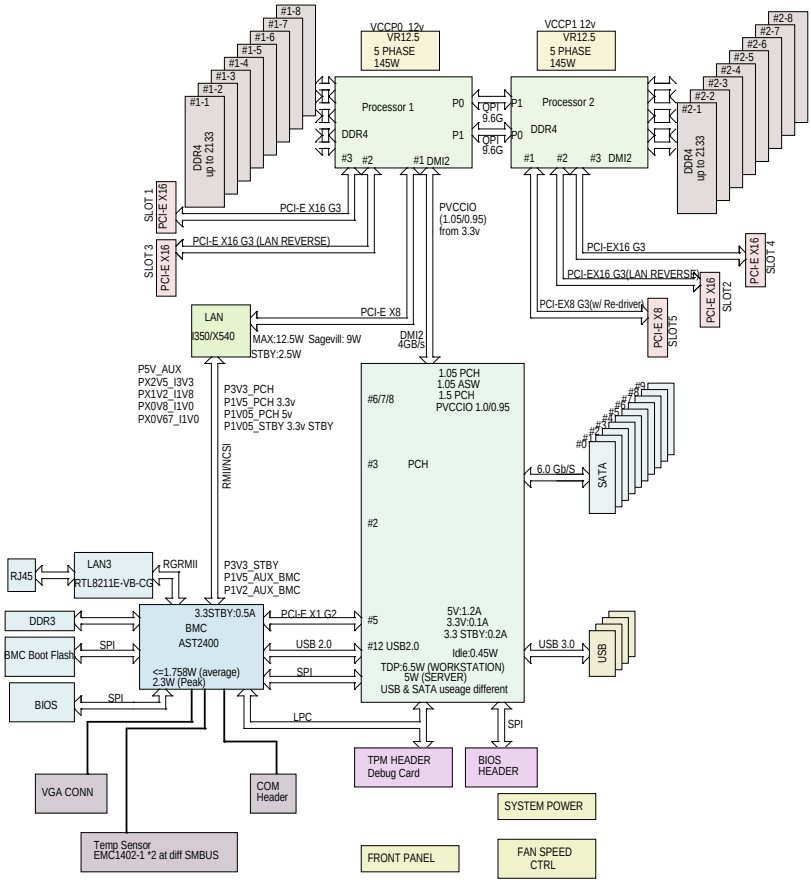


**Figure 1-1. Intel PCH C612 Chipset System Block Diagram**

**Note:** This is a general block diagram. See Chapter 5 for details.

## 1-5 Contacting Supermicro

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| Web Site: | www.supermicro.com.tw |

## Notes

# Chapter 2

# Server Installation

## 2-1 Overview

This chapter provides a quick setup checklist to get your system up and running. This quick setup assumes that your system has come to you with the processors and memory preinstalled. If your system is not already fully integrated with a serverboard, processors, system memory etc., please turn to the chapter or section noted in each step for details on installing specific components.

## 2-2 Unpacking the System

You should inspect the box the chassis was shipped in and note if it was damaged in any way. If the chassis itself shows damage, file a damage claim with the carrier who delivered it.

## 2-3 Preparing for Setup

Decide on a suitable location for the rack unit that will hold your chassis. It should be a clean, dust-free area that is well ventilated. Avoid areas where heat, electrical noise and electromagnetic fields are generated. A nearby grounded power outlet. is required

The box your chassis was shipped in should include two sets of rail assemblies, two rail mounting brackets and the mounting screws to mount the system into the rack. Please read this chapter in its entirety before beginning the installation procedure.

### Choosing a Setup Location

- Leave enough clearance in front of the rack to enable you to open the front door completely (~25 inches) and approximately 30 inches of clearance in the back of the rack to allow for sufficient airflow and ease in servicing.This product is for installation only in a Restricted Access Location (dedicated equipment rooms, service closets and the like).

- This product is not suitable for use with visual display work place devices acccording to §2 of the the German Ordinance for Work with Visual Display Units.

## 2-4 Warnings and Precautions

### Rack Precautions

- Ensure that the leveling jacks on the bottom of the rack are fully extended to the floor with the full weight of the rack resting on them.
- In single rack installation, stabilizers should be attached to the rack. In multiple rack installations, the racks should be coupled together.
- Always make sure the rack is stable before extending a component from the rack.
- You should extend only one component at a time - extending two or more simultaneously may cause the rack to become unstable.
- Rack-mounted equipment should not be used as a shelf or work space.

### Server Precautions

- Review the electrical and general safety precautions in Chapter 4.
- Determine the placement of each component in the rack *before* you install the rails.
- Install the heaviest server components on the bottom of the rack first, and then work up.
- Use a regulating uninterruptible power supply (UPS) to protect the server from power surges, voltage spikes and to keep your system operating in case of a power failure.
- Allow the hot plug SATA drives and power supply modules to cool before touching them.
- Always keep the rack's front door and all panels and components on the servers closed when not servicing to maintain proper cooling.

## Rack Mounting Considerations

### *Ambient Operating Temperature*

If installed in a closed or multi-unit rack assembly, the ambient operating temperature of the rack environment may be greater than the ambient temperature of the room. Therefore, consideration should be given to installing the equipment in an environment compatible with the manufacturer's maximum rated ambient temperature (Tmra).

### *Reduced Airflow*

Equipment should be mounted into a rack so that the amount of airflow required for safe operation is not compromised.

### *Mechanical Loading*

Equipment should be mounted into a rack so that a hazardous condition does not arise due to uneven mechanical loading.

### *Circuit Overloading*

Consideration should be given to the connection of the equipment to the power supply circuitry and the effect that any possible overloading of circuits might have on overcurrent protection and power supply wiring. Appropriate consideration of equipment nameplate ratings should be used when addressing this concern.

### *Reliable Ground*

A reliable ground must be maintained at all times. To ensure this, the rack itself should be grounded. Particular attention should be given to power supply connections other than the direct connections to the branch circuit (i.e. the use of power strips, etc.).

**Warning!** To prevent bodily injury when mounting or servicing this unit in a rack, you must take special precautions to ensure that the system remains stable. The following guidelines are provided to ensure your safety:

- This unit should be mounted at the bottom of the rack if it is the only unit in the rack.
- When mounting this unit in a partially filled rack, load the rack from the bottom to the top with the heaviest component at the bottom of the rack.
- If the rack is provided with stabilizing devices, install the stabilizers before mounting or servicing the unit in the rack.
- Slide rail mounted equipment is not to be used as a shelf or a work space.

## 2-5 Installing the System into a Rack

This section provides information on installing the chassis into a rack unit with the rails provided. There are a variety of rack units on the market, which may mean that the assembly procedure differs slightly. You should also refer to the installation instructions that came with the rack unit you are using.

**Note:** This rail will fit a rack between 26" and 33.5" deep.

**Stability hazard**. The rack stabilizing mechanism must be in place, or the rack must be bolted to the floor before you slide the unit out for servicing. Failure to stabilize the rack can cause the rack to tip over.

### Identifying the Sections of the Rack Rails

The chassis package includes two sets of rack rails, one set for the right side of the chassis and one for the left. Each set consists of an inner rail that is fixed directly to the chassis and an outer rail that attaches to the rack.

The inner rails are pre-attached and do not interfere with normal use of the chassis if you decide not to install it into a rack.

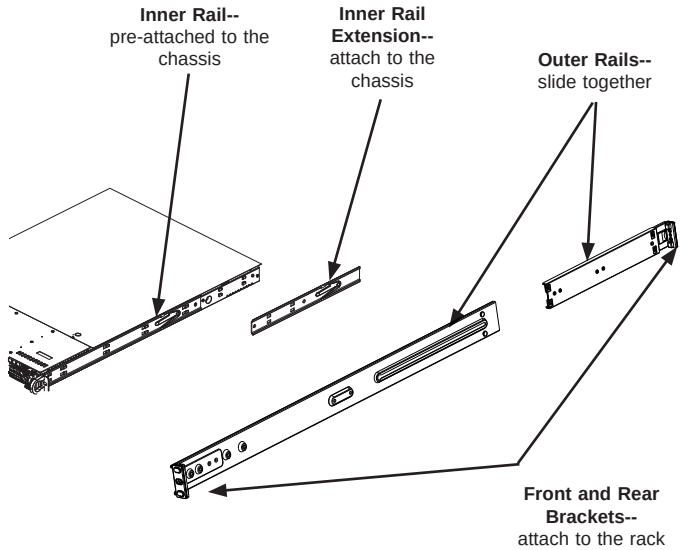



**Figure 2-1. Identifying the Sections of the Rack Rails**

## Installing the Optional Inner Rail Extensions

Attaching the optional inner rail extensions allows you to pull the server farther out of the rack. Do not put downward force on the chassis when it is fully extended.

***Installing the Inner Rail Extensions***

1. Place the inner rail extensions at the side of the chassis. Align the holes of the inner rail extension with the hooks on the side of the chassis. Make sure the extension faces outward like the inner rail.

2. Slide the extension toward the front of the chassis and under the hooks until the quick release bracket snaps into place, securing the extension to the chassis.

3. If desired, you can install a screw to further secure the extention to the chassis.

4. Repeat for the other inner rail extension.

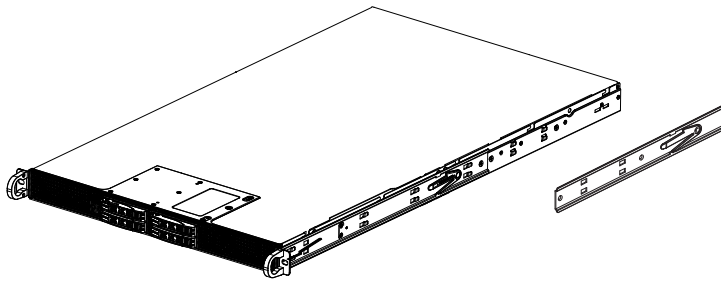


**Figure 2-2. Installing the Inner Rail Extensions**

## Assembling the Outer Rails

Each outer rail comes in two sections that must be assembled before mounting onto the rack.

***Assembling the Outer Rails***

1. Identify the left and right outer rails by examining the ends, which bend outward. Match the left front outer rail with the left rear outer rail and the same for the right rails.

2. Align the round post in the rear rail (B) with the round hole at the end of the slot in the front rail (A), and slide the front section into the rear section.

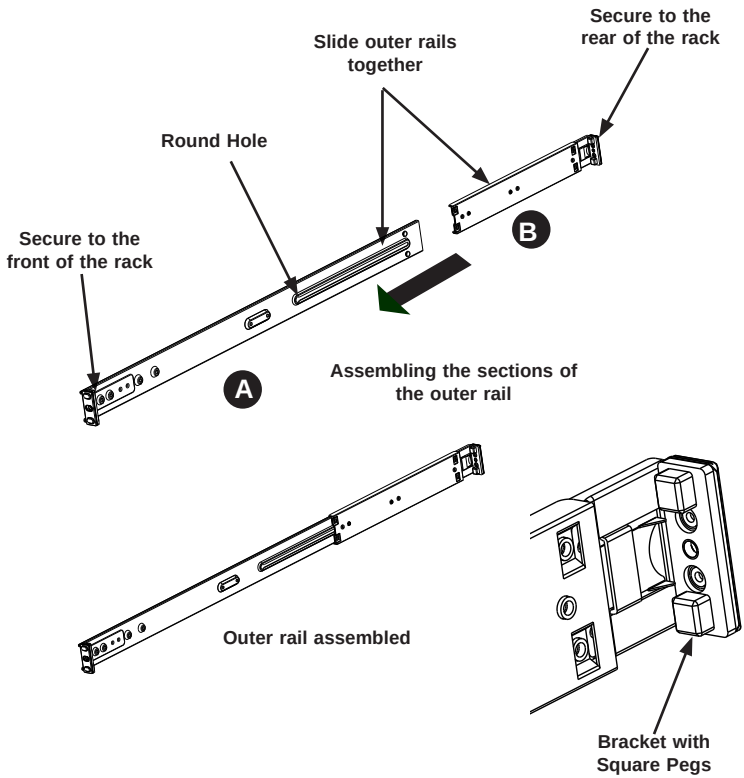



**Figure 2-3. Assembling the Outer Rails**

## Installing the Outer Rails onto the Rack

Each end of the assembled outer rail includes a bracket with square pegs to fit into your rack holes. If you have an older rack with round holes, these brackets must be removed, and you must use screws to secure the rail to the rack.

***Outer Rail Installation***

1. Align the square pegs on the front end of the rail with the square holes on the front of the rack (C). Push the rail into the rack until the quick release bracket snaps into place, securing the rail to the rack. Keep the rail horizontal.

2. Adjust the rail to reach just past the full depth of your rack.

3. Align the square pegs on the rear end of the rail to the holes on the rack (D) and push the rail into the rack until the quick release bracket snaps into place, securing the rail to the rack.

4. Repeat the procedure for the other outer rail assembly.

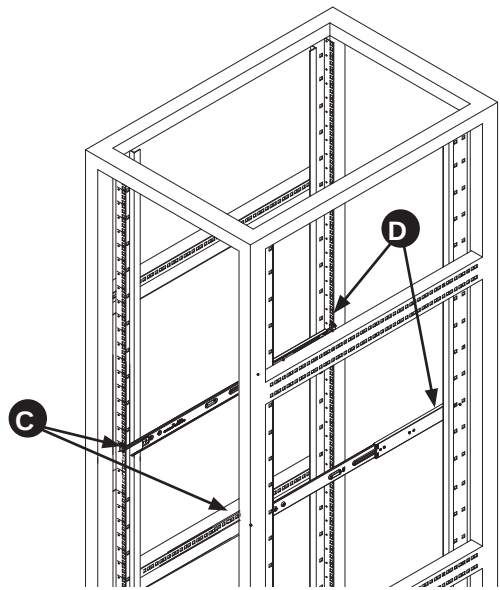



**Figure 2-4. Installing the Outer Rails to the Rack**

**Note:** The figure above is for illustrative purposes only. Always install servers at the bottom of the rack first.

**Stability hazard**. The rack stabilizing mechanism must be in place, or the rack must be bolted to the floor before you slide the unit out for servicing. Failure to stabilize the rack can cause the rack to tip over.

## Installing and Removing the Chassis From a Rack

***Installation into a Rack***

1. Slide the inner rail extensions into the front of the outer rails.
2. Push the chassis backward into the rack until it clicks into the locked postion.

***Removing the Chassis From a Rack***

1. Press the outer rail latch to release the chassis.
2. Carefully slide the chassis forward, off the outer rails and out of the chassis.

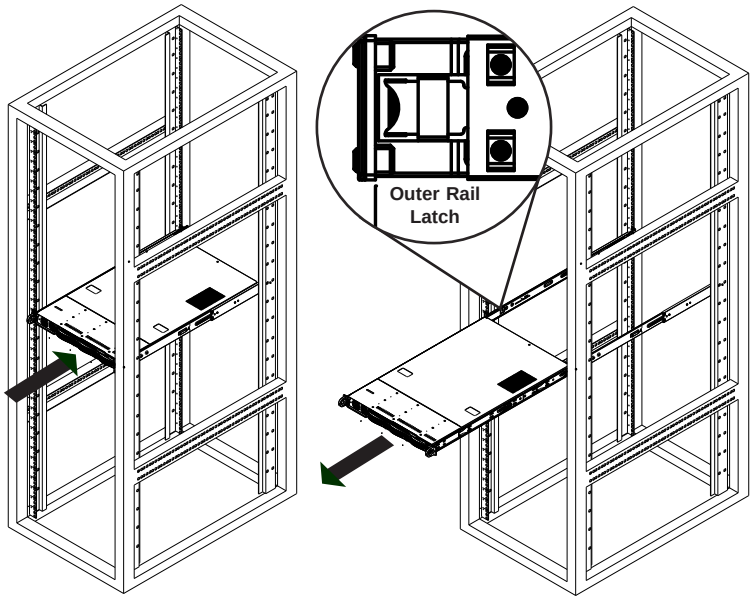



**Figure 2-5. Server Installation and Removal**

**Note:** The figure above is for illustrative purposes only. Always install servers at the bottom of the rack first.

**Warning**: Do not pick up the server with the front handles. They are designed to pull the system from a rack only.

## Installing the Server into a Telco Rack

Optional brackets are needed to install the server to a telco (open type) rack.

To install the server into a Telco type rack, use the two L-shaped brackets on either side of the chassis (four total). First, determine how far follow the server will extend out the front of the rack. Larger chassis should be positioned to balance the weight between front and back. If a bezel is included on your server, remove it. Then attach the two front brackets to each side of the chassis, then the two rear brackets positioned with just enough space to accommodate the width of the telco rack. Finish by sliding the chassis into the rack and tightening the brackets to the rack.

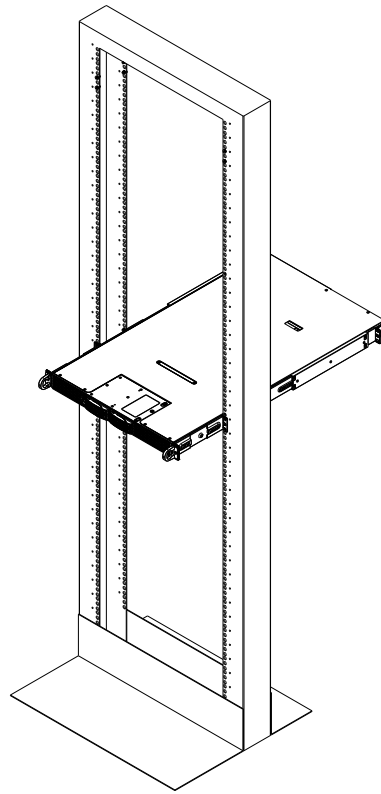


**Figure 2-6. Installing the Server into a Telco Rack**

**Note:** Figures are for illustrative purposes only. Servers should always be installed into racks starting at the bottom.

## Notes

# Chapter 3

# System Interface

## 3-1 Overview

The chassis includes:

- A control panel on the front that houses power buttons and status monitoring lights
- Status lights on externally accessible hard drives
- Status lights for the power supply visible from the back of the chassis

These elements are described in this chapter with possible responses.

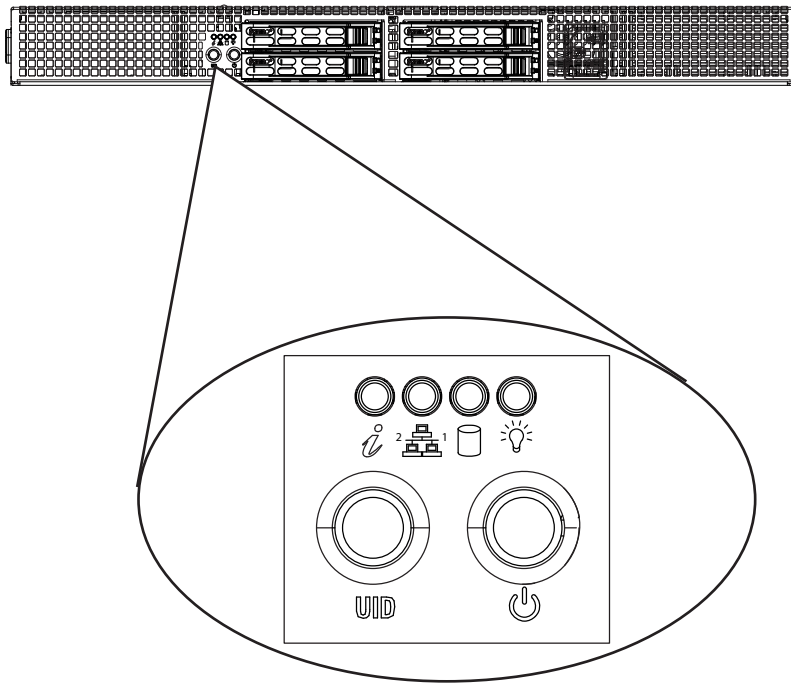



**Figure 3-1. Control Panel**

## 3-2 Control Panel Buttons

The chassis includes two push-buttons.

**UID**: The reset button is used to reboot the system.

**Power**: The main power switch is used to apply or remove power from the power supply to the server system. Turning off system power with this button removes the main power but keeps standby power supplied to the system. Therefore, you must unplug system before servicing.

## 3-3 Control Panel LEDs

There are five LEDs that provide status information about the system.

**Information LED**: Alerts operator of several states, as noted in the table below.

| Information LED | |
|---|---|
| **Status** | **Description** |
| Continuously on and red | An overheat condition has occured. (This may be caused by cable congestion.) |
| Blinking red (1Hz) | Fan failure, check for an inoperative fan. |
| Blinking red (0.25Hz) | Power failure, check for a non-operational power supply. |
| Solid blue | Local UID has been activated. Use this function to locate the server in a rack mount environment. |
| Blinking blue | Remote UID is on. Use this function to identify the server from a remote location. |

**NIC**: Indicates network activity on GLAN1 or GLAN2 when flashing.

**HDD**: Indicates activity on the hard drive when flashing.

**Power**: Indicates power is being supplied to the system power supply units. This LED should normally be illuminated when the system is operating.

## Overheating

There are several possible responses if the system overheats.

### *Overheat Temperature Setting*

Some backplanes allow the overheat temperature to be set at 45, 50, or 55 by changing a jumper setting. For more information, consult the backplane user manual at www.supermicro.com. (Click Support, then the Manuals link.)

### *Responses*

***If the server overheats:***

1. Use the LEDs to determine the nature of the overheating condition.
2. Confirm that the chassis covers are installed properly.
3. Check the routing of the cables and make sure all fans are present and operating normally.
4. Verify that the heatsinks are installed properly.

## 3-4 Drive Carrier LEDs

The chassis includes externally accessible SAS/SATA drives. Each drive carrier displays two status LEDs on the front of the carrier.

- **Green**: When illuminated, this LED indicates drive activity. It blinks on and off when that particular drive is being accessed This function is controlled by the backplane.

- **Red**: When illuminated, this LED indicates a drive failure. You should be notified by your system management software.

## 3-5 Power Supply LEDs

On the rear of the power supply module, an LED displays the status.

- **Solid Green**: When illuminated, indicates that the power supply is on.

- **Solid Amber**: When illuminated, indicates the power supply is plugged in and turned off, or the system is off but in an abnormal state.

- **Blinking Amber**: When blinking, this system power supply temperature has reached 63C. The system will automatically power-down when the power supply temperature reaches 70C and restarts when the power supply temperature goes below 60C.

# Chapter 4

# Standardized Warning Statements for AC Systems

## About Standardized Warning Statements

The following statements are industry standard warnings, provided to warn the user of situations which have the potential for bodily injury. Should you have questions or experience difficulty, contact Supermicro's Technical Support department for assistance. Only certified technicians should attempt to install or configure components.

Read this chapter in its entirety before installing or configuring components in the Supermicro chassis. Some warnings may not apply for your system.

These warnings may also be found on our web site at http://www.supermicro.com/about/policies/safety_information.cfm.

### Warning Definition

**Warning!**

This warning symbol means danger. You are in a situation that could cause bodily injury. Before you work on any equipment, be aware of the hazards involved with electrical circuitry and be familiar with standard practices for preventing accidents.

**警告の定義**

**この警告サインは危険を意味します。**

**人身事故につながる可能性がありますので、いずれの機器でも動作させる前に、**

**電気回路に含まれる危険性に**注意して、標準的な事故防止策に精通して下さい。

此警告符号代表危险。

您正处于可能受到严重伤害的工作环境中。在您使用设备开始工作之前，必须充分意识到触电的危险，并熟练掌握防止事故发生的标准工作程序。请根据每项警告结尾的声明号码找到此设备的安全性警告说明的翻译文本。

此警告符號代表危險。

您正處於可能身體可能會受損傷的工作環境中。在您使用任何設備之前，請注意觸電的危險，並且要熟悉預防事故發生的標準工作程序。請依照每一注意事項後的號碼找到相關的翻譯說明內容。

Warnung

WICHTIGE SICHERHEITSHINWEISE

Dieses Warnsymbol bedeutet Gefahr. Sie befinden sich in einer Situation, die zu Verletzungen führen kann. Machen Sie sich vor der Arbeit mit Geräten mit den Gefahren elektrischer Schaltungen und den üblichen Verfahren zur Vorbeugung vor Unfällen vertraut. Suchen Sie mit der am Ende jeder Warnung angegebenen Anweisungsnummer nach der jeweiligen Übersetzung in den übersetzten Sicherheitshinweisen, die zusammen mit diesem Gerät ausgeliefert wurden.

BEWAHREN SIE DIESE HINWEISE GUT AUF.

INSTRUCCIONES IMPORTANTES DE SEGURIDAD

Este símbolo de aviso indica peligro. Existe riesgo para su integridad física. Antes de manipular cualquier equipo, considere los riesgos de la corriente eléctrica y familiarícese con los procedimientos estándar de prevención de accidentes. Al final de cada advertencia encontrará el número que le ayudará a encontrar el texto traducido en el apartado de traducciones que acompaña a este dispositivo.

GUARDE ESTAS INSTRUCCIONES.

IMPORTANTES INFORMATIONS DE SÉCURITÉ

Ce symbole d'avertissement indique un danger. Vous vous trouvez dans une situation pouvant entraîner des blessures ou des dommages corporels. Avant de travailler sur un équipement, soyez conscient des dangers liés aux circuits électriques et familiarisez-vous avec les procédures couramment utilisées pour éviter les accidents. Pour prendre connaissance des traductions des avertissements figurant dans les consignes de sécurité traduites qui accompagnent cet appareil, référez-vous au numéro de l'instruction situé à la fin de chaque avertissement.

CONSERVEZ CES INFORMATIONS.

**תקנון הצהרות אזהרה**

הצהרות הבאות הן אזהרות על פי תקני התעשייה, על מנת להזהיר את המשתמש מפני חבלה פיזית אפשרית. במידה ויש שאלות או היתקלות בבעיה כלשהי, יש ליצור קשר עם מחלקת תמיכה טכנית של סופרמיקרו. טכנאים מוסמכים בלבד רשאים להתקין או להגדיר את הרכיבים.

יש לקרוא את הנספח במלואו לפני התקנת או הגדרת הרכיבים במארזי סופרמיקרו.

تحذير!هذا الرمز يعني خطر انك في حالة يمكن أن تتسبب في اصابة جسدية .
قبل أن تعمل على أي معدات،كن على علم بالمخاطر الناجمة عن الدوائر
الكهربائية
وكن على دراية بالممارسات الوقائية لمنع وقوع أي حوادث
استخدم رقم البيان المنصوص في نهاية كل تحذير للعثور ترجمتها

안전을 위한 주의사항

경고!

이 경고 기호는 위험이 있음을 알려 줍니다. 작업자의 신체에 부상을 야기 할 수 있는 상태에 있게 됩니다. 모든 장비에 대한 작업을 수행하기 전에 전기회로와 관련된 위험요소들을 확인하시고 사전에 사고를 방지할 수 있도록 표준 작업절차를 준수해 주시기 바랍니다.

해당 번역문을 찾기 위해 각 경고의 마지막 부분에 제공된 경고문 번호를

참조하십시오

BELANGRIJKE VEILIGHEIDSINSTRUCTIES

Dit waarschuwings symbool betekent gevaar. U verkeert in een situatie die lichamelijk letsel kan veroorzaken. Voordat u aan enige apparatuur gaat werken, dient u zich bewust te zijn van de bij een elektrische installatie betrokken risico's en dient u op de hoogte te zijn van de standaard procedures om ongelukken te voorkomen. Gebruik de nummers aan het eind van elke waarschuwing om deze te herleiden naar de desbetreffende locatie.

BEWAAR DEZE INSTRUCTIES

## Installation Instructions

**Warning!**

Read the installation instructions before connecting the system to the power source.

設置手順書

**システムを電源に接続する前に、設置手順書をお読み下さい。**

警告
将此系统连接电源前,请先阅读安装说明。

警告
將系統與電源連接前，請先閱讀安裝說明。

Warnung

Vor dem Anschließen des Systems an die Stromquelle die Installationsanweisungen lesen.

¡Advertencia!

Lea las instrucciones de instalación antes de conectar el sistema a la red de alimentación.

Attention

Avant de brancher le système sur la source d'alimentation, consulter les directives d'installation.

**יש לקרוא את הוראות התקנה לפני חיבור המערכת למקור מתח.**

اقر إرشادات التركيب قبل توصيل النظام إلى مصدر للطاقة

시스템을 전원에 연결하기 전에 설치 안내를 읽어주십시오.

Waarschuwing

Raadpleeg de installatie-instructies voordat u het systeem op de voedingsbron aansluit.

## Circuit Breaker

**Warning!**

This product relies on the building's installation for short-circuit (overcurrent) protection. Ensure that the protective device is rated not greater than: 250 V, 20 A.

**サーキット・ブレーカー**

**この製品は、短絡（過電流）保護装置がある建物での設置を前提としています。**

**保護装置の定格が250 V、20 Aを超えないことを確認下さい。**

警告

此产品的短路(过载电流)保护由建筑物的供电系统提供,确保短路保护设备的额定电流不大于250V,20A。

警告

此產品的短路(過載電流)保護由建築物的供電系統提供,確保短路保護設備的額定電流不大於250V,20A。

Warnung

Dieses Produkt ist darauf angewiesen, dass im Gebäude ein Kurzschluss- bzw. Überstromschutz installiert ist. Stellen Sie sicher, dass der Nennwert der Schutzvorrichtung nicht mehr als: 250 V, 20 A beträgt.

¡Advertencia!

Este equipo utiliza el sistema de protección contra cortocircuitos (o sobrecorrientes) del edificio. Asegúrese de que el dispositivo de protección no sea superior a: 250 V, 20 A.

Attention

Pour ce qui est de la protection contre les courts-circuits (surtension), ce produit dépend de l'installation électrique du local. Vérifiez que le courant nominal du dispositif de protection n'est pas supérieur à :250 V, 20 A.

**מוצר זה מסתמך על הגנה המותקנת במבנים למניעת קצר חשמלי. יש לוודא כי המכשיר המגן מפני הקצר החשמלי הוא לא יותר מ-**250 V, 20 A

هذا المنتج يعتمد على معدات الحماية من الدوائرالقصيرة التي تم تثبيتها في المبنى

تأكد من أن تقييم الجهاز الوقائي ليس أكثر من: 20A, 250V

경고!

이 제품은 전원의 단락(과전류)방지에 대해서 전적으로 건물의 관련 설비에 의존합니다. 보호장치의 정격이 반드시 250V(볼트), 20A(암페어)를 초과하지 않도록 해야 합니다.

Waarschuwing

Dit product is afhankelijk van de kortsluitbeveiliging (overspanning) van uw electrische installatie. Controleer of het beveiligde aparaat niet groter gedimensioneerd is dan 220V, 20A.

## Power Disconnection Warning

**Warning!**

The system must be disconnected from all sources of power and the power cord removed from the power supply module(s) before accessing the chassis interior to install or remove system components.

**電源切断の警告**

**システムコンポーネントの取り付けまたは取り外しのために、シャーシー内部にアクセスするには、**
**システムの電源はすべてのソースから切断され、電源コードは電源モジュールから取り外す必要があります。**

警告

在你打开机箱并安装或移除内部器件前,必须将系统完全断电,并移除电源线。

警告

在您打開機殼安裝或移除內部元件前，必須將系統完全斷電，並移除電源線。

Warnung

Das System muss von allen Quellen der Energie und vom Netzanschlusskabel getrennt sein, das von den Spg.Versorgungsteilmodulen entfernt wird, bevor es auf den Chassisinnenraum zurückgreift, um Systemsbestandteile anzubringen oder zu entfernen.

¡Advertencia!

El sistema debe ser disconnected de todas las fuentes de energía y del cable eléctrico quitado de los módulos de fuente de alimentación antes de tener acceso el interior del chasis para instalar o para quitar componentes de sistema.

Attention

Le système doit être débranché de toutes les sources de puissance ainsi que de son cordon d'alimentation secteur avant d'accéder à l'intérieur du chassis pour installer ou enlever des composants de systéme.

**אזהרה !**

**יש לנתק את המערכת מכל מקורות החשמל ויש להסיר את כבל החשמלי מהספק לפני גישה לחלק הפנימי של המארז לצורך התקנת או הסרת רכיבים.**

يجب فصل النظام من جميع مصادر الطاقة وإزالة سلك الكهرباء من وحدة امداد الطاقة قبل
الوصول إلى المناطق الداخلية للهيكل لتثبيت أو إزالة مكونات الجهاز

경고!

시스템에 부품들을 장착하거나 제거하기 위해서는 섀시 내부에 접근하기 전에 반드시 전원 공급장치로부터 연결되어있는 모든 전원과 전기코드를 분리해주어야 합니다.

Waarschuwing

Voordat u toegang neemt tot het binnenwerk van de behuizing voor het installeren of verwijderen van systeem onderdelen, dient u alle spanningsbronnen en alle stroomkabels aangesloten op de voeding(en) van de behuizing te verwijderen

## Equipment Installation

**Warning!**

Only trained and qualified personnel should be allowed to install, replace, or service this equipment.

**機器の設置**

**トレーニングを受け認定された人だけがこの装置の設置、交換、またはサービスを許可されています。**

警告

只有经过培训且具有资格的人员才能进行此设备的安装、更换和维修。

警告

只有經過受訓且具資格人員才可安裝、更換與維修此設備。

Warnung

Das Installieren, Ersetzen oder Bedienen dieser Ausrüstung sollte nur geschultem, qualifiziertem Personal gestattet werden.

¡Advertencia!

Solamente el personal calificado debe instalar, reemplazar o utilizar este equipo.

Attention

Il est vivement recommandé de confier l'installation, le remplacement et la maintenance de ces équipements à des personnels qualifiés et expérimentés.

**אזהרה !**

**צוות מוסמך בלבד רשאי להתקין, להחליף את הציוד או לתת שירות עבור הציוד.**

يجب أن يسمح فقط للموظفين المؤهلين والمدربين لتركيب واستبدال أو خدمة هذا الجهاز

경고!

훈련을 받고 공인된 기술자만이 이 장비의 설치, 교체 또는 서비스를 수행할 수 있습니다.

Waarschuwing

Deze apparatuur mag alleen worden geïnstalleerd, vervangen of hersteld door geschoold en gekwalificeerd personeel.

## Restricted Area

**Warning!**

This unit is intended for installation in restricted access areas. A restricted access area can be accessed only through the use of a special tool, lock and key, or other means of security. (This warning does not apply to workstations).

**アクセス制限区域**

**このユニットは、アクセス制限区域に設置されることを想定しています。**

**アクセス制限区域は、特別なツール、鍵と錠前、その他のセキュリティの手段を用いてのみ出入りが可能です。**

警告

此部件应安装在限制进出的场所，限制进出的场所指只能通过使用特殊工具、锁和钥匙或其它安全手段进出的场所。

警告

此裝置僅限安裝於進出管制區域，進出管制區域係指僅能以特殊工具、鎖頭及鑰匙或其他安全方式才能進入的區域。

Warnung

Diese Einheit ist zur Installation in Bereichen mit beschränktem Zutritt vorgesehen. Der Zutritt zu derartigen Bereichen ist nur mit einem Spezialwerkzeug, Schloss und Schlüssel oder einer sonstigen Sicherheitsvorkehrung möglich.

¡Advertencia!

Esta unidad ha sido diseñada para instalación en áreas de acceso restringido. Sólo puede obtenerse acceso a una de estas áreas mediante la utilización de una herramienta especial, cerradura con llave u otro medio de seguridad.

Attention

Cet appareil doit être installée dans des zones d'accès réservés. L'accès à une zone d'accès réservé n'est possible qu'en utilisant un outil spécial, un mécanisme de verrouillage et une clé, ou tout autre moyen de sécurité.

**אזור עם גישה מוגבלת**

**אזהרה !**
**יש להתקין את היחידה באזורים שיש בהם הגבלת גישה. הגישה ניתנת בעזרת כלי אבטחה בלבד (מפתח, מנעול וכד׳).**

تم تخصيص هذه الوحدة لتركيبها في مناطق محظورة .
يمكن الوصول إلى منطقة محظورة فقط من خلال استخدام أداة خاصة،
قفل ومفتاح أو أي وسيلة أخرى للالأمان

경고!

이 장치는 접근이 제한된 구역에 설치하도록 되어있습니다. 특수도구, 잠금 장치 및 키, 또는 기타 보안 수단을 통해서만 접근 제한 구역에 들어갈 수 있습니다.

Waarschuwing

Dit apparaat is bedoeld voor installatie in gebieden met een beperkte toegang. Toegang tot dergelijke gebieden kunnen alleen verkregen worden door gebruik te maken van speciaal gereedschap, slot en sleutel of andere veiligheidsmaatregelen.

## Battery Handling

**Warning!**

There is the danger of explosion if the battery is replaced incorrectly. Replace the battery only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions

**電池の取り扱い**

**電池交換が正しく行われなかった場合、破裂の危険性があります。交換する電池はメーカーが推奨する型、または同等のものを使用下さい。使用済電池は製造元の指示に従って処分して下さい。**

警告
电池更换不当会有爆炸危险。请只使用同类电池或制造商推荐的功能相当的电池更换原有电池。请按制造商的说明处理废旧电池。

警告
電池更換不當會有爆炸危險。請使用製造商建議之相同或功能相當的電池更換原有電池。請按照製造商的說明指示處理廢棄舊電池。

Warnung

Bei Einsetzen einer falschen Batterie besteht Explosionsgefahr. Ersetzen Sie die Batterie nur durch den gleichen oder vom Hersteller empfohlenen Batterietyp. Entsorgen Sie die benutzten Batterien nach den Anweisungen des Herstellers.

Attention

Danger d'explosion si la pile n'est pas remplacée correctement. Ne la remplacer que par une pile de type semblable ou équivalent, recommandée par le fabricant. Jeter les piles usagées conformément aux instructions du fabricant.

¡Advertencia!

Existe peligro de explosión si la batería se reemplaza de manera incorrecta. Reemplazar la batería exclusivamente con el mismo tipo o el equivalente recomendado por el fabricante. Desechar las baterías gastadas según las instrucciones del fabricante.

**אזהרה !**

**קיימת סכנת פיצוץ של הסוללה במידה והוחלפה בדרך לא תקינה. יש להחליף את הסוללה בסוג התואם מחברת יצרן מומלצת.**

**סילוק הסוללות המשומשות יש לבצע לפי הוראות היצרן.**

هناك خطر من انفجار في حالة استبدال البطارية بطريقة غير صحيحة فعليك استبدال البطارية
فقط بنفس النوع أو ما يعادلها كما أوصت به الشركة المصنعة
تخلص من البطاريات المستعملة وفقا لتعليمات الشركة الصانعة

경고!

배터리가 올바르게 교체되지 않으면 폭발의 위험이 있습니다. 기존 배터리와 동일하거나 제조사에서 권장하는 동등한 종류의 배터리로만 교체해야 합니다. 제조사의 안내에 따라 사용된 배터리를 처리하여 주십시오.

Waarschuwing

Er is ontploffingsgevaar indien de batterij verkeerd vervangen wordt. Vervang de batterij slechts met hetzelfde of een equivalent type die door de fabrikant aanbevolen wordt. Gebruikte batterijen dienen overeenkomstig fabrieksvoorschriften afgevoerd te worden.

## **Redundant Power Supplies** (if applicable to your system)

**Warning!**

This unit might have more than one power supply connection. All connections must be removed to de-energize the unit.

**冗長電源装置**
**このユニットは複数の電源装置が接続されている場合があります。**
**ユニットの電源を切るためには、すべての接続を取り外さなければなりません。**

警告
此部件连接的电源可能不止一个，必须将所有电源断开才能停止给该部件供电。

警告
此裝置連接的電源可能不只一個，必須切斷所有電源才能停止對該裝置的供電。

Warnung

Dieses Gerät kann mehr als eine Stromzufuhr haben. Um sicherzustellen, dass der Einheit kein trom zugeführt wird, müssen alle Verbindungen entfernt werden.

¡Advertencia!

Puede que esta unidad tenga más de una conexión para fuentes de alimentación. Para cortar por completo el suministro de energía, deben desconectarse todas las conexiones.

Attention

Cette unité peut avoir plus d'une connexion d'alimentation. Pour supprimer toute tension et tout courant électrique de l'unité, toutes les connexions d'alimentation doivent être débranchées.

**אם קיים יותר מספק אחד**

**אזהרה !**
**ליחדה יש יותר מחיבור אחד של ספק. יש להסיר את כל החיבורים על מנת לרוקן את היחידה.**

قد يكون لهذا الجهاز عدة اتصالات بوحدات امداد الطاقة.
يجب إزالة كافة الاتصالات لعزل الوحدة عن الكهرباء

경고!

이 장치에는 한 개 이상의 전원 공급 단자가 연결되어 있을 수 있습니다. 이 장치에 전원을 차단하기 위해서는 모든 연결 단자를 제거해야만 합니다.

Waarschuwing

Deze eenheid kan meer dan één stroomtoevoeraansluiting bevatten. Alle aansluitingen dienen verwijderd te worden om het apparaat stroomloos te maken.

## **Backplane Voltage** (if applicable to your system)

**Warning!**

Hazardous voltage or energy is present on the backplane when the system is operating. Use caution when servicing.

**バックプレーンの電圧**

**システムの稼働中は危険な電圧または電力が、バックプレーン上にかかっています。**

**修理する際には注意ください。**

警告

当系统正在进行时，背板上有很危险的电压或能量，进行维修时务必小心。

警告

當系統正在進行時，背板上有危險的電壓或能量，進行維修時務必小心。

Warnung

Wenn das System in Betrieb ist, treten auf der Rückwandplatine gefährliche Spannungen oder Energien auf. Vorsicht bei der Wartung.

¡Advertencia!

Cuando el sistema está en funcionamiento, el voltaje del plano trasero es peligroso. Tenga cuidado cuando lo revise.

Attention

Lorsque le système est en fonctionnement, des tensions électriques circulent sur le fond de panier. Prendre des précautions lors de la maintenance.

**מתח בפנל האחורי**

**אזהרה !**
**קיימת סכנת מתח בפנל האחורי בזמן תפעול המערכת. יש להיזהר במהלך העבודה.**

هناك خطر من التيار الكهربائي أوالطاقة الموجودة على اللوحة
عندما يكون النظام يعمل كن حذرا عند خدمة هذا الجهاز

경고!

시스템이 동작 중일 때 후면판 (Backplane)에는 위험한 전압이나 에너지가 발생합니다. 서비스 작업 시 주의하십시오.

Waarschuwing

Een gevaarlijke spanning of energie is aanwezig op de backplane wanneer het systeem in gebruik is. Voorzichtigheid is geboden tijdens het onderhoud.

## Comply with Local and National Electrical Codes

**Warning!**

Installation of the equipment must comply with local and national electrical codes.

**地方および国の電気規格に準拠**
**機器の取り付けはその地方および国の電気規格に準拠する必要があります。**

警告

设备安装必须符合本地与本国电气法规。

警告

設備安裝必須符合本地與本國電氣法規。

Warnung

Die Installation der Geräte muss den Sicherheitsstandards entsprechen.

¡Advertencia!

La instalacion del equipo debe cumplir con las normas de electricidad locales y nacionales.

Attention

L'équipement doit être installé conformément aux normes électriques nationales et locales.

**תיאום חוקי החשמל הארצי**

**אזהרה !**
**התקנת הציוד חייבת להיות תואמת לחוקי החשמל המקומיים והארציים.**

تركيب المعدات الكهربائية يجب أن يمتثل للقوانين المحلية والوطنية المتعلقة بالكهرباء

경고!

현 지역 및 국가의 전기 규정에 따라 장비를 설치해야 합니다.

Waarschuwing

Bij installatie van de apparatuur moet worden voldaan aan de lokale en nationale elektriciteitsvoorschriften.

## Product Disposal

**Warning!**

Ultimate disposal of this product should be handled according to all national laws and regulations.

**製品の廃棄**

**この製品を廃棄処分する場合、国の関係する全ての法律・条例に従い処理する必要があります。**

警告
本产品的废弃处理应根据所有国家的法律和规章进行。

警告
本產品的廢棄處理應根據所有國家的法律和規章進行。

Warnung

Die Entsorgung dieses Produkts sollte gemäß allen Bestimmungen und Gesetzen des Landes erfolgen.

¡Advertencia!

Al deshacerse por completo de este producto debe seguir todas las leyes y reglamentos nacionales.

Attention

La mise au rebut ou le recyclage de ce produit sont généralement soumis à des lois et/ou directives de respect de l'environnement. Renseignez-vous auprès de l'organisme compétent.

**סילוק המוצר**

**אזהרה !**
**סילוק סופי של מוצר זה חייב להיות בהתאם להנחיות וחוקי המדינה.**

عند التخلص النهائي من هذا المنتج ينبغي التعامل معه وفقا لجميع القوانين واللوائح الوطنية

경고!

이 제품은 해당 국가의 관련 법규 및 규정에 따라 폐기되어야 합니다.

Waarschuwing

De uiteindelijke verwijdering van dit product dient te geschieden in overeenstemming met alle nationale wetten en reglementen.

## **Hot Swap Fan Warning** (if applicable to your system)

**Warning!**

The fans might still be turning when you remove the fan assembly from the chassis. Keep fingers, screwdrivers, and other objects away from the openings in the fan assembly's housing.

**ファン・ホットスワップの警告**

**シャーシから冷却ファン装置を取り外した際、ファンがまだ回転している可能性があります。ファンの開口部に、指、ドライバー、およびその他のものを近づけないで下さい。**

警告
当您从机架移除风扇装置，风扇可能仍在转动。小心不要将手指、螺丝起子和其他物品太靠近风扇

警告
當您從機架移除風扇裝置，風扇可能仍在轉動。小心不要將手指、螺絲起子和其他物品太靠近風扇。

Warnung

Die Lüfter drehen sich u. U. noch, wenn die Lüfterbaugruppe aus dem Chassis genommen wird. Halten Sie Finger, Schraubendreher und andere Gegenstände von den Öffnungen des Lüftergehäuses entfernt.

¡Advertencia!

Los ventiladores podran dar vuelta cuando usted quite ell montaje del ventilador del chasis. Mandtenga los dedos, los destornilladores y todos los objetos lejos de las aberturas del ventilador

Attention

Il est possible que les ventilateurs soient toujours en rotation lorsque vous retirerez le bloc ventilateur du châssis. Prenez garde à ce que doigts, tournevis et autres objets soient éloignés du logement du bloc ventilateur.

**אזהרה !**
**כאשר מסירים את חלקי המאוורר מהמארז, יתכן והמאוררים עדיין עובדים. יש להרחיק למרחק בטוח את האצבעות וכלי עבודה שונים מהפתחים בתוך המאוורר**

من الممكن أن المراوح لا تزال تدور عند إزالة كتلة المروحة من الهيكل يجب إبقاء الأصابع ومفكات البراغي
وغيرها من الأشياء بعيدا عن الفتحات في كتلة المروحة.

경고!

섀시로부터 팬 조립품을 제거할 때 팬은 여전히 회전하고 있을 수 있습니다. 팬 조림품 외관의 열려있는 부분들로부터 손가락 및 스크류드라이버, 다른 물체들이 가까이 하지 않도록 배치해 주십시오.

Waarschuwing

Het is mogelijk dat de ventilator nog draait tijdens het verwijderen van het ventilatorsamenstel uit het chassis. Houd uw vingers, schroevendraaiers en eventuele andere voorwerpen uit de buurt van de openingen in de ventilatorbehuizing.

## Power Cable and AC Adapter

**Warning!**

When installing the product, use the provided or designated connection cables, power cables and AC adaptors. Using any other cables and adaptors could cause a malfunction or a fire. Electrical Appliance and Material Safety Law prohibits the use of UL or CSA -certified cables (that have UL/CSA shown on the code) for any other electrical devices than products designated by Supermicro only.

**電源コードとACアダプター**

**製品を設置する場合、提供または指定された接続ケーブル、電源コードとACアダプターを使用下さい。他のケーブルやアダプタを使用すると故障や火災の原因になることがあります。電気用品安全法は、ULまたはCSA認定のケーブル(UL/CSEマークがコードに表記)を Supermicroが指定する製品以外に使用することを禁止しています。**

警告

安装此产品时,请使用本身提供的或指定的连接线,电源线和电源适配器.使用其它线材或适配器可能会引起故障或火灾。除了Supermicro所指定的产品,电气用品和材料安全法律规定禁止使用未经UL或CSA认证的线材。(线材上会显示UL/CSA符号)。

警告

安裝此產品時,請使用本身提供的或指定的連接線,電源線和電源適配器.使用其它線材或適配器可能會引起故障或火災。除了Supermicro所指定的產品,電氣用品和材料安全法律規定禁止使用未經UL或CSA認證的線材。(線材上會顯示UL/CSA符號)。

Warnung

Bei der Installation des Produkts, die zur Verfügung gestellten oder benannt Anschlusskabel, Stromkabel und Netzteile. Verwendung anderer Kabel und Adapter kann zu einer Fehlfunktion oder ein Brand entstehen. Elektrische Geräte und Material Safety Law verbietet die Verwendung von UL-oder CSA-zertifizierte Kabel, UL oder CSA auf der Code für alle anderen elektrischen Geräte als Produkte von Supermicro nur bezeichnet gezeigt haben.

¡Advertencia!

Al instalar el producto, utilice los cables de conexión previstos o designados, los cables y adaptadores de CA. La utilización de otros cables y adaptadores podría ocasionar un mal funcionamiento o un incendio. Aparatos Eléctricos y la Ley de Seguridad del Material prohíbe el uso de UL o CSA cables certificados que tienen UL o CSA se muestra en el código de otros dispositivos eléctricos que los productos designados por Supermicro solamente.

Attention

Lors de l'installation du produit, utilisez les bables de connection fournis ou désigné. L'utilisation d'autres cables et adaptateurs peut provoquer un dysfonctionnement ou un incendie. Appareils électroménagers et de loi sur la sécurité Matériel interdit l'utilisation de UL ou CSA câbles certifiés qui ont UL ou CSA indiqué sur le code pour tous les autres appareils électriques que les produits désignés par Supermicro seulement.

**חשמליים ומתאמי AC**

**אזהרה !**

**כאשר מתקינים את המוצר, יש להשתמש בכבלים, ספקים ומתאמים AC אשר נועדו וסופקו לשם כך. שימוש בכל כבל או מתאם אחר יכול לגרום לתקלה או קצר חשמלי. על פי חוקי שימוש במכשירי חשמל וחוקי בטיחות, קיים איסור להשתמש בכבלים המוסמכים ב- UL או ב- CSA (כשאר מופיע עליהם קוד של UL/CSA) עבור כל מוצר חשמלי אחר שלא צוין על ידי סופרמיקרו בלבד.**

عند تركيب الجهاز يجب استخدام كابلات التوصيل،والكابلات الكهربائية ومحولات التيار المتردد
التي . أن استخدام أي كابلات ومحولات أخرى يتسبب في حدوث عطل أو حريق. تم توفيرها لك مع المنتج
الأجهزة الكهربائية ومواد قانون السلامة يحظر استخدام الكابلات CSA أو UL معتمدة من قبل
لأي أجهزة كهربائية أخرى غير المنتجات المعينة من قبل Supermicro
(التي تحمل علامة UL/CSA)

경고!

제품을 설치할 때에는 제공되거나 지정된 연결케이블과 전원케이블, AC어댑터를 사용해야 합니다. 그 밖의 다른 케이블들이나 어댑터들은 고장 또는 화재의 원인이 될 수 있습니다. 전기용품안전법 (Electrical Appliance and Material Safety Law)은 슈퍼마이크로에서 지정한 제품들 외에는 그 밖의 다른 전기 장치들을 위한 UL또는 CSA에서 인증한 케이블(전선 위에 UL/CSA가 표시)들의 사용을 금지합니다.

Waarschuwing

Bij het installeren van het product, gebruik de meegeleverde of aangewezen kabels, stroomkabels en adapters. Het gebruik van andere kabels en adapters kan leiden tot een storing of een brand. Elektrisch apparaat en veiligheidsinformatiebladen wet verbiedt het gebruik van UL of CSA gecertificeerde kabels die UL of CSA die op de code voor andere elektrische apparaten dan de producten die door Supermicro alleen.

## Notes

# Chapter 5

# Advanced Serverboard Setup

This chapter covers the steps required to connect cables and describes all jumpers and connections. A layout and quick reference chart are included in this chapter for your reference. Always close the chassis when you have finished working on the system to maintain optimal cooling.

## 5-1 Handling the Serverboard

Electrostatic Discharge (ESD) can damage electronic components. To prevent damage to any printed circuit boards (PCBs), it is important to handle them very carefully (see previous chapter). To prevent the serverboard from bending, keep one hand under the center of the board to support it when handling. The following measures are generally sufficient to protect your equipment from electric static discharge.

### Precautions

- Use a grounded wrist strap designed to prevent Electrostatic Discharge (ESD).
- Touch a grounded metal object before removing any board from its antistatic bag.
- Handle a board by its edges only; do not touch its components, peripheral chips, memory modules or gold contacts.
- When handling chips or modules, avoid touching their pins.
- Put the serverboard, add-on cards and peripherals back into their antistatic bags when not in use.
- For grounding purposes, make sure your computer chassis provides excellent conductivity between the power supply, the case, the mounting fasteners and the serverboard.

### Unpacking

The serverboard is shipped in antistatic packaging to avoid electrical static discharge. When unpacking the board, make sure the person handling it is static protected.

## 5-2 Connecting Cables

Assuming the X10DRG-H(T) serverboard is installed, the next step is to connect the cables to the board. These include the data (ribbon) cables for the peripherals and control panel and the power cables.

### Connecting Data Cables

The ribbon cables used to transfer data from the peripheral devices have been carefully routed to prevent them from blocking the flow of cooling air that moves through the system from front to back. If you need to disconnect any of these cables, you should take care to keep them routed as they were originally after reconnecting them (make sure the red wires connect to the pin 1 locations). The following data cables (with their locations noted) should be connected. (See the layout in section 5-7 for connector locations.)

- SATA drive data cables (S-SATA0 ~ 3)
- SATA sideband cable (S-SGPIO ~ 1)
- Control Panel cable (JF1)
- GPU power cables (JPW3, JPW7 and JPW11)
- SATA backplane power cable (JPW3)

**Important!** Make sure the the cables do not come into contact with the fans.

### Connecting Power Cables

The serverboard has one proprietary main power (JPW1) and six 8-pin 12V power connectors (JPW2-JPW7). One 8-pin connector is used to supply power to the serverboard, and the other five 8-pin connectors are used for HDD backplane and GPU expansion cards. See Section 5-8 for power connector pin definitions.

### Connecting the Control Panel

JF1 contains header pins for various front control panel connectors. See Figure 5-4 for the pin locations of the various front control panel buttons and LED indicators.

All JF1 wires have been bundled into a single ribbon cable to simplify this connection. Make sure the red wire plugs into pin 1 as marked on the board. The other end connects to the Control Panel PCB board, located just behind the system status LEDs on the chassis. See Section 5-8 for details and pin descriptions.

## 5-3 I/O Ports

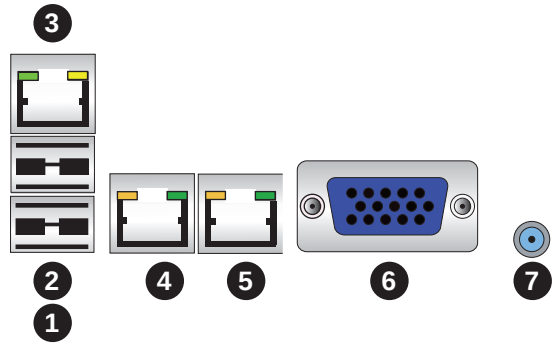



**Figure 5-1. I/O Ports**

| IO Ports | | | |
|---|---|---|---|
| 1. | USB Port 0 | 5. | LAN Port 2 |
| 2. | USB Port 1 | 6. | VGA Port |
| 3. | IPMI Dedicated LAN | 7. | UID Switch |
| 4. | LAN Port 1 | | |

For X10DRG-H the LAN ports are 1Gb; for X10DRG-HT the LAN ports are 10Gb.

## 5-4 Installing the Processor and Heatsink

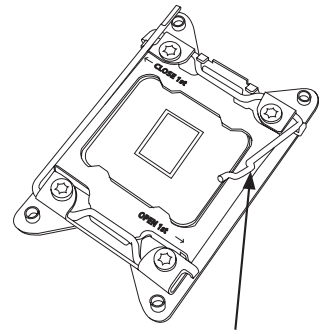
**Notes:**

- Always remove the power cord before adding, removing or changing a CPU.
- When receiving a serverboard without a processor pre-installed, make sure that the plastic CPU socket cap is in place and none of the socket pins are bent; otherwise, contact your retailer immediately.
- If you buy a CPU separately, use only an Intel-certified, multi-directional heatsink.
- Avoid placing direct pressure to the top of the processor package.
- Install the processor into the CPU socket before installing the heatsink.
- Refer to the Supermicro web site for updates on CPU support.

### Installing an LGA 2011 Processor

***Installing a CPU***

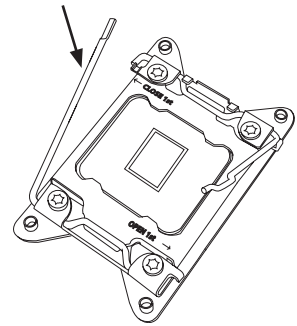
1. There are two levers on the LGA 2011 socket. First press and release the load lever labeled "Open 1st".



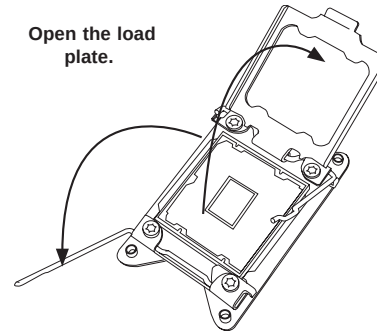

**Release the lever labeled "Open 1st"**

**Release the lever labeled "Close 1st"**

2. Press the second load lever labeled "Close 1st" to release the load plate from its locked position.

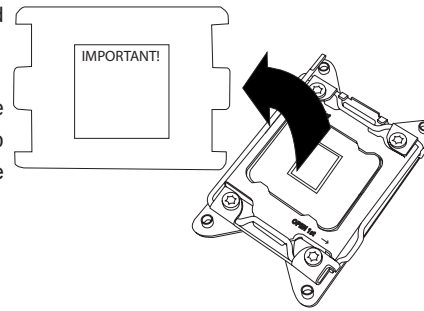


3. With the second lever fully retracted, gently push down on the "Open 1st" lever to loosen the load plate. Lift the load plate with your fingers to open it completely.

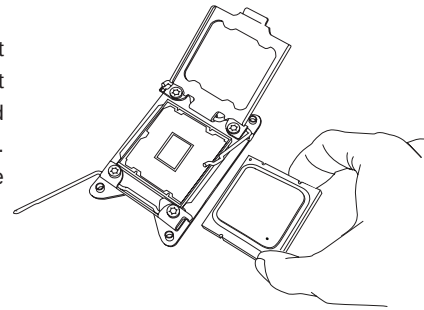



4. Pop the plastic cap marked "Warning" out of the load plate.

5. Holding the CPU carefully above the socket, orient the CPU so that all keys and edges will fit the socket.

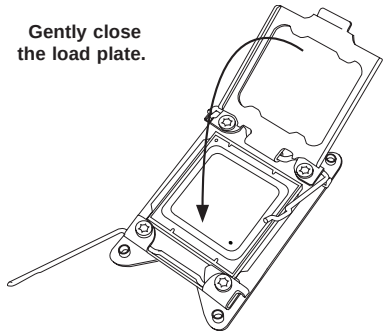



6. Carefully lower the CPU straight down into the socket. Do not move the CPU horizontally, and do not rub the pins of the socket. This may damage the CPU or the socket.

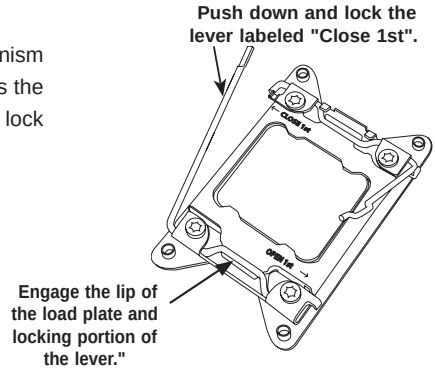


**Caution:** You can only install the CPU into the socket in one direction. Make sure that the CPU is properly inserted into the socket before closing the load plate. If it does not close properly, do not force it as it may damage your CPU. Instead, open the load plate again and double-check that the CPU is aligned properly.

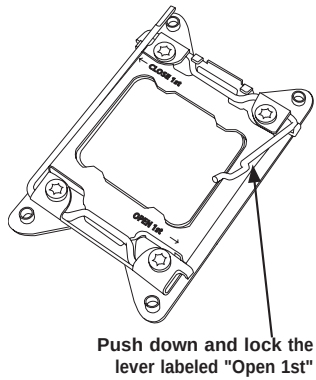
7. With the "Close 1st" lever fully retracted, gently close the load plate.




8. Make sure the locking mechanism on the "Close 1st" lever catches the lip of the load plate. Close and lock the "Close 1st" lever.




9. Close and lock the "Open 1st" lever.



## Installing a CPU Heatsink

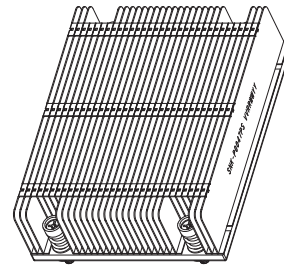
1. Remove power from the system and unplug the AC power cord from the power supply.

2. Do not apply any thermal grease to the heatsink or the CPU die; the required amount has already been applied.

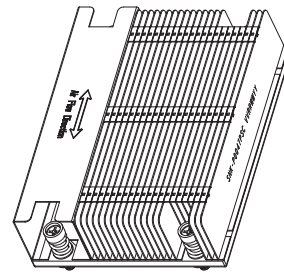
3. Place the heatsink on top of the CPU so that the four mounting holes are aligned with those on the (preinstalled) heatsink retention mechanism.

4. Screw in two diagonal screws until just snug. Do not fully tighten the screws or you may damage the CPU.)

5. Add the two remaining screws then finish the installation by fully tightening all four screws.



**SNK-P0047PS (CPU1)**



**SNK-P0047PSC (CPU2)**

## Removing the Heatsink

**Caution:** We do not recommend removing the CPU or the heatsink. If you do need to remove the heatsink, please follow the instructions below to prevent damage to the CPU or the CPU socket.

1. Unplug the power cord from the power supply.

2. Unscrew and remove the heatsink screws in the opposite sequence shown in the picture above.

3. Hold the heatsink and gently wriggle it to loosen it from the CPU. (Do not use excessive force!)

4. Once the heatsink is loosened, remove it from the CPU.

5. Clean the surface of the CPU and the heatsink to get rid of the old thermal grease. Reapply the proper amount of thermal grease before re-installing the heatsink.

## 5-5 Installing Memory

Caution: Exercise care installing or removing DIMM modules to avoid damage.

***Installing Memory Modules***

Insert the desired number of DIMMs into the memory slots, starting with P1-DIMM 1A

1. Push the release tabs outwards on both ends of the DIMM slot to unlock it.
2. Align the key on the DIMM module with the receptive point on the slot.
3. Use two thumbs together to press on both ends of the module straight down into the slot until the module snaps into place.
4. Press the release tabs to the lock positions to secure the DIMM module into the slot. See Figure 5-2.

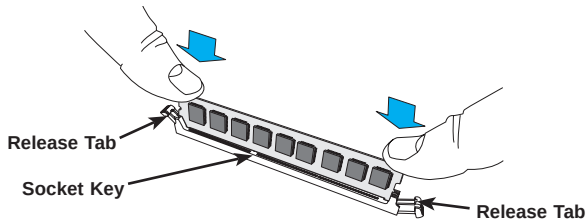



**Figure 5-2. Installing DIMM into Slot**

### Memory Support

The serverboard supports up to 1TB of 288-pin Registered (RDIMM)/Load Reduced (LRDIMM) DDR4 ECC 2133/1866/1600 MHz in 16 slots. Memory speed support is dependent on the CPUs. For best memory performance, please install memory modules of the same type and same speed. For the latest CPU/memory updates, refer to the Supermicro website.

#### *Processor/DIMM Population Configurations*

For memory to work properly, follow the tables below for memory installation.

- Install DIMMs in pairs, that is, use an even number of DIMMs.
- All channels in a system will run at the fastest common frequency.

| Processors and their Corresponding Memory Modules | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **CPU#** | **Corresponding DIMM Modules** | | | | | | | |
| **CPU 1** | P1-DIMMA1 | P1-DIMMB1 | P1-DIMMC1 | P1-DIMMD1 | P1-DIMMA2 | P1-DIMMB2 | P1-DIMMC2 | P1-DIMMD2 |
| **CPU2** | P2-DIMME1 | P2-DIMMF1 | P2-DIMMG1 | P2-DIMMH1 | P2-DIMME2 | P2-DIMM F2 | P2-DIMMG2 | P2-DIMMH2 |

| Processor and Memory Module Population for Optimal Performance | |
|---|---|
| **Number of CPUs+DIMMs** | **CPU and Memory Population Configuration Table** |
| **1 CPU & 2 DIMMs** | CPU1<br>P1-DIMMA1/P1-DIMMB1 |
| **1 CPU & 4 DIMMs** | CPU1<br>P1-DIMMA1/P1-DIMMB1, P1-DIMMC1/P1-DIMMD1 |
| **1 CPU & 5~8 DIMMs** | CPU1<br>P1-DIMMA1/P1-DIMMB1, P1-DIMMC1/P1-DIMMD1 + Any memory pairs in P1-DIMMA2/P1-DIMMB2/P1-DIMMC2/P1-DIMMD2 slots |
| **2 CPUs & 4 DIMMs** | CPU1 + CPU2<br>P1-DIMMA1/P1-DIMMB1, P2-DIMME1/P2-DIMMF1 |
| **2 CPUs & 6 DIMMs** | CPU1 + CPU2<br>P1-DIMMA1/P1-DIMMB1/P1-DIMMC1/P1-DIMMD1, P2-DIMME1/P2-DIMMF1 |
| **2 CPUs & 8 DIMMs** | CPU1 + CPU2<br>P1-DIMMA1/P1-DIMMB1/P1-DIMMC1/P1-DIMMD1, P2-DIMME1/P2-DIMMF1/P2-DIMMG1/P2-DIMMH1 |
| **2 CPUs & 9~16 DIMMs** | CPU1/CPU2<br>P1-DIMMA1/P1-DIMMB1/P1-DIMMC1/P1-DIMMD1, P2-DIMME1/P2-DIMMF1/P2-DIMMG1/P2-DIMMH1 + Any memory pairs in P1, P2 DIMM slots |
| **2 CPUs & 16 DIMMs** | CPU1/CPU2<br>P1-DIMMA1/P1-DIMMB1/P1-DIMMC1/P1-DIMMD1, P2-DIMME1/P2-DIMMF1/ P2-DIMMG1/P2-DIMMH1,P1-DIMMA2/P1-DIMMB2/P1-DIMMC2/P1-DIMMD2, P2-DIMME2/P2-DIMMF2/P2-DIMMG2/P2-DIMMH2 |

| Type | Ranks Per DIMM and Data Width | DIMM Capacity (GB) | | Speed (MT/s); Voltage (V); Slot Per Channel (SPC) and DIMM Per Channel (DPC) | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | 1 Slot Per Channel | 2 Slots Per Channel | | 3 Slots Per Channel | | |
| | | | | 1DPC | 1DPC | 2DPC | 1DPC | 2DPC | 3DPC |
| | | 4Gb | 8Gb | 1.2V | 1.2V | 1.2V | 1.2V | 1.2V | 1.2V |
| RDIMM | SRx4 | 8GB | 16GB | 2133 | 2133 | 1866 | 1866 | 1866 | 1333 |
| RDIMM | SRx8 | 4GB | 8GB | 2133 | 2133 | 1866 | 1866 | 1866 | 1333 |
| RDIMM | DRx4 | 16GB | 32GB | 2133 | 2133 | 1866 | 1866 | 1866 | 1333 |
| LRDIMM | QRx4 | 32GB | 64GB | 2133 | 2133 | 2133 | 2133 | 2133 | 1600 |
| LRDIMM 3DS† | 8Rx4 | 64GB | 128GB | 2133 | 2133 | 2133 | 2133 | 2133 | 1600 |

## 5-6 Serverboard Details

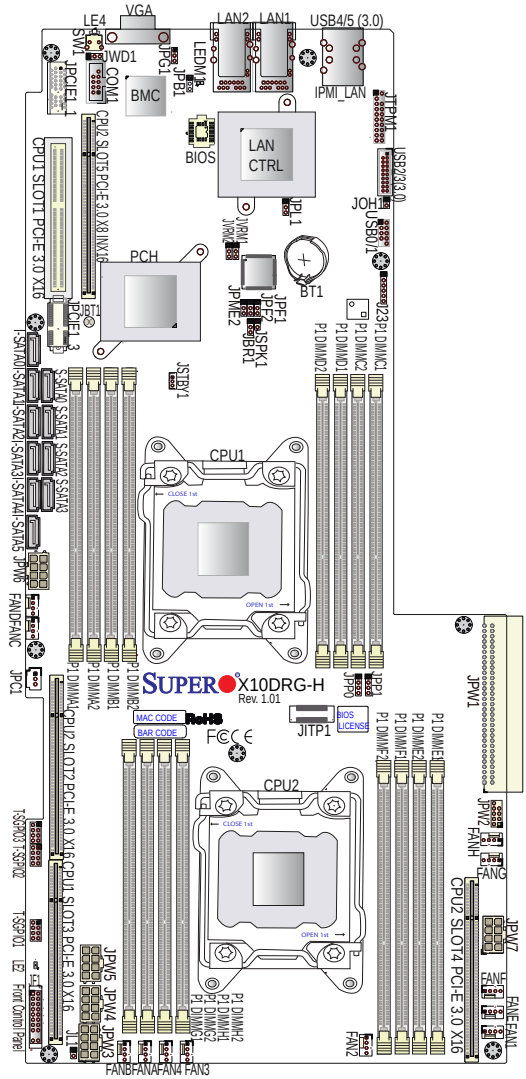



**Figure 5-3. X10DRG-H(T) Layout**

**Notes**

Jumpers not indicated are for test purposes only.

"■" indicates the location of Pin 1.

The X10DRG-HT supports two X540-based 10G LAN ports, the X10DRG-H supports two I350-based 1G LAN ports.

**X10DRG-H(T) Jumpers**

| Jumper | Description | Default Setting |
|---|---|---|
| JBT1 | Clear CMOS | See Chapter 2 |
| JPB1 | BMC Enable | Pins 1-2 (Enabled) |
| JPG1 | VGA Enable | Pins 1-2 (Enabled) |
| JPL1 | GLAN1/GLAN2 Enable (X10DRG-H)<br>10_GLAN1/10G_LAN2 Enable (X10DRG-HT) | Pins 1-2 (Enabled) |
| JPME2 | Manufacture (ME) Mode Select | Pins 1-2 (Normal) |
| JWD1 | Watch-Dog Timer Enable | Pins 1-2 (Reset) |

**X10DRG-H(T) Connectors**

| Connectors | Description |
|---|---|
| Battery (BT1) | Onboard CMOS Battery (See Chpt. 3 for used battery disposal) |
| COM1 | Backplane COM port |
| FAN 1/2/3/4, FAN A/B/C/D/E/F/G/H | CPU/System fan headers (Fan 1-4, Fan A-H) |
| JF1 | Front_Panel_Control header |
| JL1 | Chassis intrusion |
| JPC1 | 3-pin header |
| JPCIE1_1 | Proprietary SPEC Slot 1 (See Note 1 on Page 1-6.) |
| JPCIE1_3 | Proprietary SPEC Slot 1 (See Note 1 on Page 1-6.) |
| JPW1 | Proprietary main power connector |
| JPW2 | 8-pin power connector |
| JPW3/JPW4/JPW5/ JPW6/JPW7 | 12V 8-Pin power connectors used for HDD backplane (BPN) or GPU add-on cards |
| JSPK1 | Internal buzzer/speaker |
| JSTBY1 | Standby power connector |
| JTPM1 | TPM (Trusted Platform Module)/Port 80 header |
| LAN1/LAN2 | G-bit Ethernet (GLAN) ports 1/2 (for X10DRG-H)<br>10 G-bit Ethernet (GLAN) ports 1/2 (for X10DRG-HT) |
| (IPMI)_LAN | IPMI_Dedicated LAN support by the Aspeed controller |
| (I-)SATA 0-5 | Intel SATA 3.0 connectors (0-5) from Intel PCH |
| (S)-SATA0-3 | SATA connectors (0-3) from Intel SCU |
| T-SGPIO1/2/3 | Serial_Link General-Purpose I/O (SGPIO) headers for I-SATA connections (I-SGPIO1 for I-SATA0-3, I-SGPIO2 for I-SATA4/5, I-SGPIO3 for S-SATA0-3) |
| (CPU1) SLOT1/3 | PCI-Exp. 3.0 x16 Slot1/Slot3 supported by CPU1 |
| (CPU2) SLOT2/4 | PCI-Exp. 3.0 x16 Slot2/Slot4 supported by CPU2 |
| (CPU2) SLOT5 | PCI-Exp. 3.0 x8 in x16 slot supported by CPU2 |

| | |
|---|---|
| SW1 | UID Switch |
| (BP) USB 4/5 (3.0) | Backpanel USB 3.0 Port 4/Port 5 |
| (FP) 2/3 (3.0) | Front Accessible USB 3.0 headers 0/1, 2/3 |
| (FP) USB 0/1 (2.0) | Front-Accessible USB 2.0 header for two USB connections USB 0/1 |
| VGA | Backpanel VGA port |

**X10DRG-H(T) LED Indicators**

| LED | Description | State | Status |
|---|---|---|---|
| LE4 | Rear UID LED | Blue: On | Unit Identified |
| LE2 | Onboard PWR LED | On | System Power On |
| LEDM1 | BMC Heartbeat LED | Green: Blinking | BMC Normal |

**Notes:**

- For JPCIE1-1/JPCIE1-3 PCI slots to work properly, use proprietary riser cards (eg. RSC-R1UG-E16AR+II) in the slots.
- PCI Slot 1, Slot 2 and Slot 5 are controlled by CPU1 and are only available when a processor is installed in CPU Socket 1. PCI Slot 3, Slot 4 and Slot 6 are controlled by CPU2 and are available only when a processor is installed in CPU Socket 2.
- To provide adequate power supply to the system, be sure to connect all onboard power connectors to the power supply.

**Caution:** To avoid damaging the power supply or the serverboard, be sure to connect the power supply to the SMCI-proprietary power connector (JPW1), and six 8-pin power connectors (JPW2, JPW3-7) on the serverboard. Failure in doing so may void the manufacturer warranty on your power supply and serverboard.

## 5-7 Connector Definitions

### Power Connectors

The X10DRG-H(T) serverboard has one proprietary main power (JPW1) and six 8-pin 12V power connectors (JPW2, JPW3/JPW4/JPW5/JPW6/JPW7). The 8-pin power connector located at JPW2 is used to supply power to the serverboard, and the other five 8-pin power connectors located at JPW3-JPW7 are used for HDD backplane and GPU add-on cards. Be sure to connect all these power connectors to your power supply to ensure adequate power supply to your system. See the table below for the pin definitions for the 8-pin power connectors.

| 12V 8-pin Power Connector Pin Definitions | |
|---|---|
| Pins | Definition |
| 1 through 4 | Ground |
| 5 through 8 | +12V |

JPW1: Proprietary main PWR

JPW2: 8-pin Processor PWR

JPW3-JPW7: 8-pin Processor PWR used for HDD BPN/GPU cards

### Power Button Connector

The PW_ON connector is on pins 1 and 2 of JF1. Momentarily contacting both pins will power on/off the system. This button can also be configured to function as a suspend button (with a setting in the BIOS, see Chapter 7). To turn off the power when set to suspend mode, press the button for at least 4 seconds. Refer to the table on the right for pin definitions.

This header should be connected to the chassis power button.

| Power Button Pin Definitions (JF1) | |
|---|---|
| Pin# | Definition |
| 1 | Signal |
| 2 | Ground |

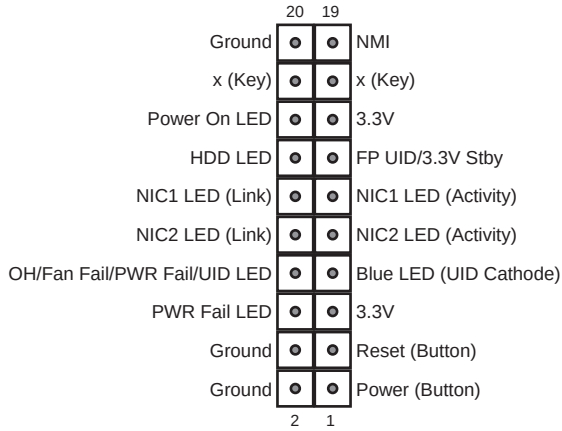



**Figure 5-4. JF1 Control Panel Header Pins**

### Reset Connector

The reset connector is located on pins 3 and 4 of JF1 and attaches to the reset switch on the computer chassis. See the table on the right for pin definitions.

**Reset Button Pin Definitions (JF1)**

| Pin# | Definition |
|---|---|
| 3 | Reset |
| 4 | Ground |

### Power Fail LED

The Power Fail LED connection is located on pins 5 and 6 of JF1. Refer to the table on the right for pin definitions.

**PWR Fail LED Pin Definitions (JF1)**

| Pin# | Definition |
|---|---|
| 5 | 3.3V |
| 6 | PWR Fail LED |

### Overheat/Fan Fail/UID LED

Connect an LED cable to pins 7 and 8 of JF1 for the Overheat/Fan Fail and UID LED connections. The Red LED on pin 8 provides warnings of overheating, fan failure or power failure. The Blue LED on pin 7 works as the front panel UID LED indicator. UID button located on pins 13 and 14 of JF1. Refer to the tables on the right for more information.

**OH/Fan Fail/Blue_UID LED Pin Definitions (JF1)**

| Pin# | Definition |
|---|---|
| 7 | Blue_UID LED |
| 8 | OH/Fan Fail/Power Fail (Red) |

**OH/Fan Fail LED Status (Red LED)**

| State | Definition |
|---|---|
| Off | Normal |
| On | Overheat |
| Flashing | Fan Fail |

### NIC2 (LAN2) LED

The LED connections for LAN2 are on pins 9 and 10 of JF1. Attach an LED cable to display network activity. See the table on the right for pin definitions.

**NIC2 LED Pin Definitions (JF1)**

| Pin# | Definition |
|---|---|
| 9 | Activity LED |
| 10 | Link LED |

### NIC1 (LAN1) LED

The LED connections for LAN1 are on pins 11 and 12 of JF1. Attach an LED cable to display network activity. See the table on the right for pin definitions.

**NIC1 LED Pin Definitions (JF1)**

| Pin# | Definition |
|---|---|
| 11 | Activity LED |
| 12 | Link LED |

### HDD LED/ UID Button

The HDD LED connection is pin 14 of JF1. It lights the LED upon HDD activity. The pin 13 connection carries the signal from the UID button on the front panel. it lights the UID LED on pin 7 of JF1. When the user presses and releases the UID button, the UID LED will be turned on or off to indicate the location of the unit in a stack or rackmounted servers.

**HDD/UID LED Pin Definitions (JF1)**

| Pin# | Definition |
|---|---|
| 13 | UID Signal/3.3V |
| 14 | HDD Activity |

### Power On LED

The Power On LED connector is located on pins 15 and 16 of JF1. This connection is used to provide LED indication of power being supplied to the system. See the table on the right for pin definitions.

**Power LED Pin Definitions (JF1)**

| Pin# | Definition |
|---|---|
| 15 | +3.3V |
| 16 | Control |

### NMI Header

The non-maskable interrupt button header is located on pins 19 and 20 of JF1. Refer to the table on the right for pin definitions.

**NMI Button Pin Definitions (JF1)**

| Pin# | Definition |
|---|---|
| 1 | Control |
| 2 | Ground |

### Fan Headers

The serverboard has twelve fan headers. Fans 1~4 are for CPU/system use and Fans A~H for GPU use.. All are 4-pin fan headers, which are backward compatible with traditional 3-pin fans. However, fan speed control is available for 4-pin fans only. The fan speeds are controlled by Thermal Management via IPMI 2.0 interface. See the table on the right for pin definitions.

**Fan Header Pin Definitions**

| Pin# | Definition |
|---|---|
| 1 | Ground |
| 2 | +12V |
| 3 | Tachometer |
| 4 | Pulse Width Modulation |

### Internal Buzzer

The Speaker header, located at JSPK1, can be used to provide audible alarms for various beep codes. See the table on the right for pin definitions.

**Internal Buzzer Pin Definitions**

| Pin# | Definitions | |
|---|---|---|
| Pin 1 | Pos. (+) | 5V |
| Pin 2 | Neg. (-) | Alarm Speaker |

### Chassis Intrusion

A Chassis Intrusion header is located at JL1 on the serverboard. Attach an appropriate cable from the chassis to inform you of a chassis intrusion when the chassis is opened.

**Chassis Intrusion Pin Definitions**

| Pin# | Definition |
|---|---|
| 1 | Intrusion Input |
| 2 | Ground |

### T-SGPIO Headers 1/2/3

Three SGPIO (Serial-Link General Purpose Input/Output) headers are provided on the serverboard. T-SGPIO1 supports I-SATA 0-3, T-SGPIO2 supports I-SATA 4/5. TSGPIO3 is used for S-SATA 0-3.. See the table on the right for pin definitions.

**T-SGPIO Pin Definitions**

| Pin# | Definition | Pin | Definition |
|---|---|---|---|
| 1 | NC | 2 | NC |
| 3 | Ground | 4 | Data |
| 5 | Load | 6 | Ground |
| 7 | Clock | 8 | NC |

NC = No Connection

### Chassis Intrusion

A Chassis Intrusion header is located at JL1 on the motherboard. Attach an appropriate cable from the chassis to inform you of a chassis intrusion when the chassis is opened.

**Chassis Intrusion Pin Definitions**

| Pin# | Definition |
|---|---|
| 1 | Intrusion Input |
| 2 | Ground |

### Standby Power Header

The +5V Standby Power header is located at JSTBY1 on the motherboard. See the table on the right for pin definitions. (You must also have a card with a Standby Power connector and a cable to use this feature.)

**Standby PWR Pin Definitions**

| Pin# | Definition |
|---|---|
| 1 | +5V Standby |
| 2 | Ground |
| 3 | No Connection |

### TPM/Port 80 Header

A Trusted Platform Module/Port 80 header, located at JTPM1, provides TPM support and Port 80 connection. Use this header to enhance system performance and data security. See the table on the right for pin definitions.

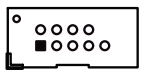
**TPM/Port 80 Header Pin Definitions**

| Pin # | Definition | Pin # | Definition |
|---|---|---|---|
| 1 | LCLK | 2 | GND |
| 3 | LFRAME# | 4 | <(KEY)> |
| 5 | LRESET# | 6 | +5V (X) |
| 7 | LAD 3 | 8 | LAD 2 |
| 9 | +3.3V | 10 | LAD1 |
| 11 | LAD0 | 12 | GND |
| 13 | SMB_CLK4 | 14 | SMB_DAT4 |
| 15 | +3V_DUAL | 16 | SERIRQ |
| 17 | GND | 18 | CLKRUN# (X) |
| 19 | LPCPD# | 20 | LDRQ# (X) |

## I/O Connections

### Serial Ports

A COM connection (COM1) is located next to the BMC chip. This port provides serial port support. See the table on the right for pin definitions.



**Serial Port Pin Definitions**

| Pin # | Definition | Pin # | Definition |
|---|---|---|---|
| 1 | DCD | 6 | DSR |
| 2 | RXD | 7 | RTS |
| 3 | TXD | 8 | CTS |
| 4 | DTR | 9 | RI |
| 5 | Ground | 10 | NC |

### Video Connection

A video (VGA) port is located next to LAN ports 0/1 on the rear I/O shield. Refer to the motherboard layout below for the location.

### Universal Serial Bus (USB)

Two USB 3.0 ports (USB 4/5) are located on the I/O rear I/O shield. In addition, two internal USB headers, provide four USB 3.0 connections (USB 0/1, USB 2/3) for front panel support. (Cables are not included). See the tables on the right for pin definitions.

**Front Panel USB 0/1, 2/3 Pin Definition**

| Pin# | Definition | Pin# | Definitions |
|---|---|---|---|
| 1 | +5V | 2 | +5V |
| 3 | USB_PN2 | 4 | USB_PN3 |
| 5 | USB_PP2 | 6 | USB_PP3 |
| 7 | Ground | 8 | Ground |
| 9 | Key | 10 | Ground |

### Ethernet Ports

Two Ethernet ports (LAN1, LAN2) are located on the rear I/O shield. These Ethernet ports support 10G LAN connections on the X10DRG-HT, and Gigabit LAN connections on the X10DRG-H. In addition, an IPMI_Dedicated LAN that supports Gigabit LAN is located above USB 4/5 ports on the rear I/O shield. All Ethernet ports accept RJ45 type cables.

### Unit Identifier Switch

A Unit Identifier (UID) switch and two LED indicators are provided on the serverboard. The rear UID LED (LE4) is located next to the rear UID switch. The front panel UID switch and LED are described with JF1 connectors. Pressing a UID switch will turn on both the rear and front UID LEDs. Pressing a UID switch again will turn off both LEDs. These UIDs provide easy identification of a system unit that may be in need of service.

**Note:** the UID can also be triggered via IPMI. Refer to the IPMI User's Guide on the Supermicro website.

| UID Switch | |
|---|---|
| Pin# | Definition |
| 1 | Button In |
| 2 | Ground |
| 3 | Ground |
| 4 | Ground |

| UID LED Status | |
|---|---|
| Color/State | Status |
| Blue: On | Unit Identified |

### Rear UID LED

The rear UID LED is located at LE4 on the backplane. This LED is used in conjunction with the rear UID switch to provide easy identification of a system that might be in need of service.

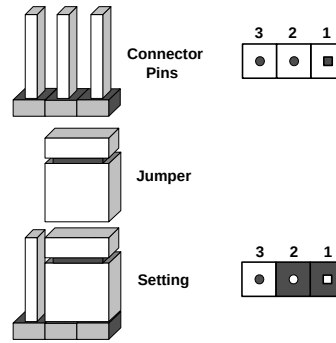
| UID LED Status | | |
|---|---|---|
| Color/State | OS | Status |
| Blue: On | Windows OS | Unit Identified |
| Blue: Blinking | Linux OS | Unit Identified |

## 5-8 Jumper Settings

### Explanation of Jumpers

To modify the operation of the serverboard, jumpers can be used to choose between optional settings. Jumpers create shorts between two pins to change the function of the connector. Pin 1 is identified with a square solder pad on the printed circuit board. See the serverboard layout pages for jumper locations.

**Note:** On a two-pin jumper, "Closed" means the jumper is on both pins and "Open" means the jumper is either on only one pin or completely removed.




### CMOS Clear

JBT1 is used to clear CMOS (which will also clear any passwords). Instead of pins, this jumper consists of contact pads to prevent accidentally clearing the contents of CMOS.

***To clear CMOS,***

1. First power down the system and unplug the power cord(s).
2. With the power disconnected, short the CMOS pads with a metal object such as a small screwdriver.
3. Remove the screwdriver (or shorting device).
4. Reconnect the power cord(s) and power on the system.

**Note:** *Do not use the PW_ON connector to clear CMOS*.

### LAN1/2 Enable/Disable

Change the setting of jumper JPL1 to enable or disable the LAN1/LAN2 Ethernet ports on the serverboard. See the table on the right for jumper settings. The default setting is enabled.

| **LAN Enable Jumper Settings** | |
|---|---|
| Jumper Setting | Definition |
| 1-2 | Enabled (default) |
| 2-3 | Disabled |

### VGA Enable/Disable

JPG1 allows you to enable or disable the VGA port. The default position is on pins 1 and 2 to enable VGA. See the table on the right for jumper settings.

**VGA Enable/Disable Jumper Settings**

| Jumper Setting | Definition |
|---|---|
| Pins 1-2 | Enabled |
| Pins 2-3 | Disabled |

### Watch Dog Enable/Disable

JWD1 controls the Watch Dog function. Watch Dog is a system monitor that can reboot the system when a software application hangs. Jumping pins 1-2 (default) will cause WD to reset the system if an application hangs. Jumping pins 2-3 will generate a non-maskable interrupt signal for the application that hangs. See the table on the right for jumper settings. Watch Dog must also be enabled in BIOS.

**Note:** When enabled, the user must write their own application software to disable the Watch Dog Timer.

**Watch Dog Jumper Settings**

| Jumper Setting | Definition |
|---|---|
| Pins 1-2 | Reset |
| Pins 2-3 | NMI |
| Open | Disabled |

### Manufacturer Mode Select

Close jumper JPME1 to bypass SPI flash security and force the system to use the Manufacturer Mode, which allows the user to flash the system firmware from a host server to modify system settings. See the table on the right for jumper settings.

**ME Mode Select Jumper Settings**

| Jumper Setting | Definition |
|---|---|
| 1-2 | Normal (Default) |
| 2-3 | Manufacture Mode |

### Power Force-On Enable

Jumpers JPF1/JPF2 are used for power force on. The default setting is on pins 2-3 for normal operation. See the table on the right for jumper settings.

**Power Force-On Enable Jumper Settings**

| Jumper | Definition |
|---|---|
| 1-2 | Enabled |
| 2-3 | Normal (Default) |

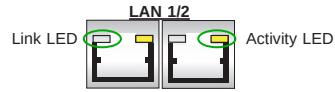
### BMC Enable/Disable

Use jumper JPB1 to enable or disable the BMC (Baseboard Management Controller), which supports IPMI 2.0/KVM. See the table on the right for jumper settings.

**BMC Enable/Disable Jumper Settings**

| Both Jumpers | Definition |
|---|---|
| Pins 1-2 | Enabled |
| Pins 2-3 | Disabled |

# 5-9 Onboard Indicators




### LAN1/2 Port LEDs

The Ethernet ports have two LEDs. On each port, one LED indicates activity and teh other indicates the speed of the connection. It may be green, amber or off to. See the table on the right for the functions associated with the connection speed LED.

| GLAN Activity Indicator (Left) LED Settings | | |
|---|---|---|
| Color | Status | Definition |
| Yellow | Flashing | Active |

| LAN Link Indicator LED Settings | |
|---|---|
| LED Color | Definition |
| Off | No Connection, 10 or 100 Mbps |
| Green | 10 Gbps (X10DRFR-T Only) |
| Amber | 1 Gbps |

### Dedicated IPMI LAN Port LEDs

A dedicated IPMI LAN port is also located on the I/O backplane. The amber LED on the right indicates activity, while the green LED on the left indicates the speed of the connection. Note that the IPMI LAN does not support 1Gbps connections. See the table at right.

| IPMI LAN Link LED (Left) & Activity LED (Right) | | |
|---|---|---|
| | Color/State | Definition |
| Link (Left) | Green: Solid | 100 Mbps |
| Activity (Right) | Amber: Blinking | Active |

### Onboard Power LED

An Onboard Power LED is located at LE2. This LED Indicator is on when the system is on. Be sure to unplug the AC power cable before removing or adding any components. See the table on the right for more details.

| Onboard PWR LED Indicator | |
|---|---|
| LED Color | Definition |
| Off | System Off (power cable not connected) |
| Green | System On |
| Green: Flashing Quickly | ACPI S1 State |

### BMC Heartbeat LED

The BMC Heartbeat LED is designated LEDM1. When it is blinking, the BMC (Baseboard Management Controller) is functioning normally.

| BMC Heatbeat LED Indicator LED Status | |
|---|---|
| Green: Blinking | BMC: Normal |

## 5-10 SATA Ports

### SATA Ports

There are ten SATA 3.0 (I-SATA 0-5 & S-SATA0-3) on the motherboard. I-SATA ports are supported by the Intel PCH C612, and S-SATA ports are supported by the Intel SCU chip. See the table on the right for pin definitions.

**SATA Port Pin Definitions**

| Pin # | Definition |
|---|---|
| 1 | Ground |
| 2 | SATA_TXP |
| 3 | SATA_TXN |
| 4 | Ground |
| 5 | SATA_RXN |
| 6 | SATA_RXP |
| 7 | Ground |

## 5-11 Installing Software

The Supermicro ftp site contains drivers and utilities for your system at ftp://ftp.supermicro.com. Some of these must be installed, such as the chipset driver.

After accessing the ftp site, go into the CDR_Images directory and locate the ISO file for your serverboard. Download this file to create a CD/DVD of the drivers and utilities it contains. (You may also use a utility to extract the ISO file if preferred.)

Another option is to go to the Supermicro Website at http://www.supermicro.com/products/. Find the product page for your serverboard here, where you may download individual drivers and utilities.

After creating a CD/DVD with the ISO files, insert the disk into the CD/DVD drive on your system and the display shown in Figure 5-5 should appear.

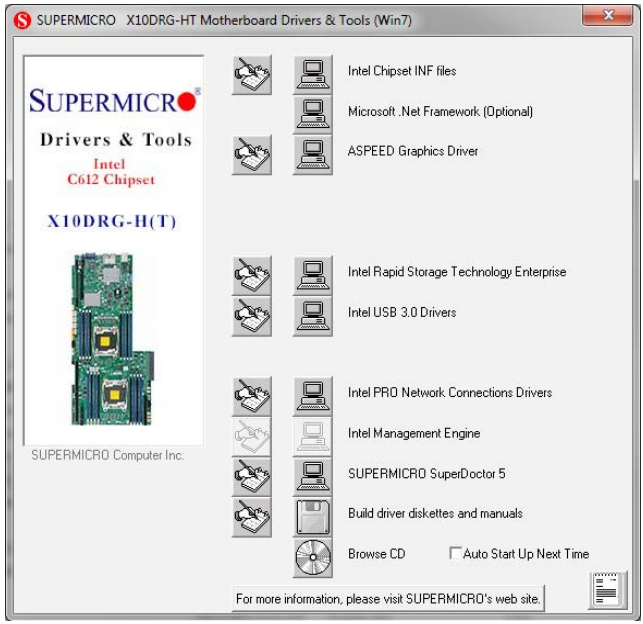



**Figure 5-5. Driver Installation Display Screen**

**Note:** Click the icons showing a hand writing on paper to view the readme files for each item. Click the computer icons to the right of these items to install each item (from top to the bottom) one at a time. **After installing each item, you must re-boot the system before moving on to the next item on the list.** The bottom icon with a CD on it allows you to view the entire contents.

### SuperDoctor® 5

The Supermicro SuperDoctor 5 is a program that functions in a command-line or web-based interface in Windows and Linux operating systems. The program monitors system health information such as CPU temperature, system voltages, system power consumption, fan speed, and provides alerts via email or Simple Network Management Protocol (SNMP).

SuperDoctor 5 comes in local and remote management versions and can be used with Nagios to maximize your system monitoring needs. With SuperDoctor 5 Management Server (SSM Server), you can remotely control power on/off and reset chassis intrusion for multiple systems with SuperDoctor 5 or IPMI. SD5 Management Server monitors HTTP, FTP, and SMTP services to optimize the efficiency of your operation.

**Note:** The default User Name and Password for SuperDoctor 5 is ADMIN/ADMIN.

**Figure 5-6. SuperDoctor 5 Interface Display Screen (Health Information)**

**Note:** The SuperDoctor 5 program and User's Manual can be downloaded from the Supermicro web site at http://www.supermicro.com/products/nfo/sms_sd5.cfm.

## 5-12 Onboard Battery

Care must be taken to assure that the chassis cover is in place when the system is operating to ensure proper cooling. Out of warranty damage to the system can occur if this practice is not strictly followed.

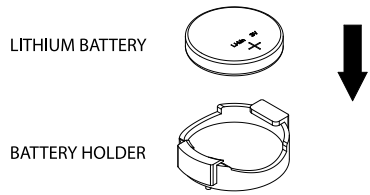



**Figure 5-8. Installing the Onboard Battery**

Please handle used batteries carefully. Do not damage the battery in any way; a damaged battery may release hazardous materials into the environment. Do not discard a used battery in the garbage or a public landfill. Please comply with the regulations set up by your local hazardous waste management agency to dispose of your used battery properly.

# Chapter 6

# Advanced Chassis Setup

This chapter covers the steps required to install components and perform maintenance on the SC118GHTS-R1K66BP chassis. The only tool required is a Phillips screwdriver.

Your system may require the installation of processors, memory, drives or expansion cards. Other procedures presented in this chapter are for maintenance or replacement.

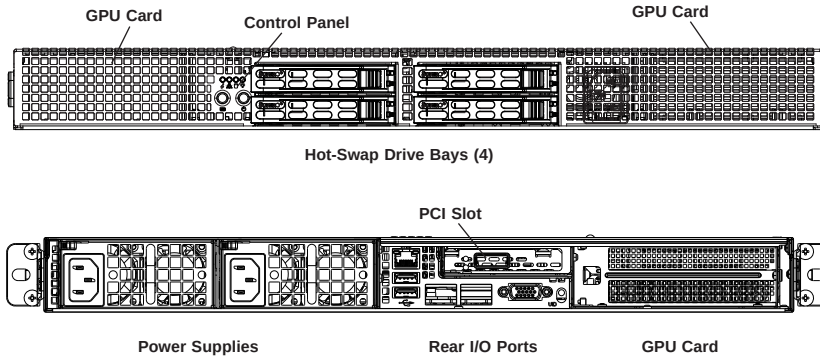



**Figure 6-1. Chassis Front and Rear Views**

## 6-1 Static-Sensitive Devices

Electrostatic Discharge (ESD) can damage electronic components. To prevent damage to any printed circuit boards (PCBs), it is important to handle them very carefully.

The following measures are generally sufficient to protect your equipment from ESD damage.

### Precautions

- Use a grounded wrist strap designed to prevent static discharge.
- Touch a grounded metal object before removing any board from its antistatic bag.
- Handle a board by its edges only; do not touch its components, peripheral chips, memory modules or gold contacts.
- When handling chips or modules, avoid touching their pins.
- Put the serverboard, add-on cards and peripherals back into their antistatic bags when not in use.
- For grounding purposes, make sure your computer chassis provides excellent conductivity between the power supply, the case, the mounting fasteners and the serverboard.

## 6-2 Control Panel

The control panel (located on the front of the chassis) must be connected to the JF1 connector on the serverboard to provide you with system status indications. A ribbon cable has bundled these wires together to simplify the connection. Connect the cable from JF1 on the serverboard to the appropriate header on the Control Panel PCB (printed circuit board). Make sure the red wire plugs into pin 1 on both connectors. Pull all excess cabling out of the airflow path.

The control panel LEDs inform you of system status. See "Chapter 3: System Interface" for details on the LEDs and the control panel buttons. Details on JF1 can be found in "Chapter 5: Advanced Serverboard Installation."

## 6-3 Installing Drives

Drive bays are accessible from the front of the chassis without removing the chassis cover or powering down the system. The hard disk drives are mounted in drive carriers to simplify their installation and removal from the chassis. These carriers also help promote proper airflow for the drive bays. For this reason, even carriers without drives installed must remain in the chassis during system operation.

***Removing Drive Carriers from the Chassis***

1. Press the release button on the drive carrier. This extends the drive carrier handle.
2. Use the handle to pull the drive carrier out of the chassis.

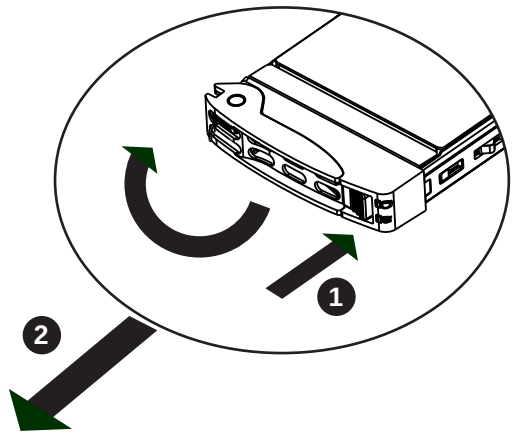



**Figure 6-2. Removing a Drive Carrier**

Enterprise level hard disk drives are recommended for use in Supermicro chassis and servers. For information on recommended HDDs, visit the Supermicro Web site at http://www.supermicro.com/products/nfo/storage.cfm

***Installing a Drive***

1. Remove the dummy drive, which comes pre-installed in the drive carrier, by removing the screws securing the dummy drive to the carrier. These screws are not used to mount the actual hard drive.

2. Insert a drive into the carrier with the PCB side facing down and the connector end toward the rear of the carrier. Align the drive in the carrier so that the screw holes of line up. Note that there are holes in the carrier marked “SATA” to aid in correct installation.

3. Secure the drive to the carrier with four M3 screws as illustrated below. These screws are included in the chassis accessory box.

4. Insert the drive carrier with the disk drive into its bay, keeping the carrier oriented so that the hard drive is on the top of the carrier and the release button is on the right side. When the carrier reaches the rear of the bay, the release handle will retract.

5. Push the handle in until it clicks into its locked position

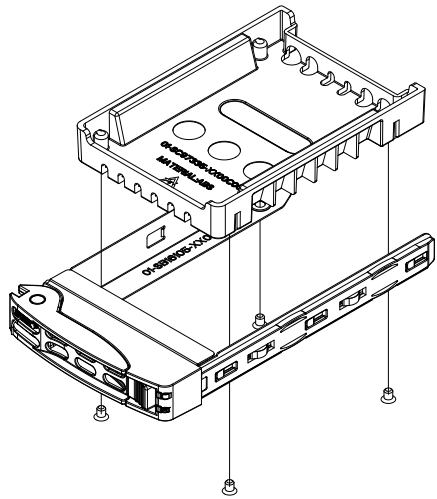


**Figure 6-3. Removing the Dummy Drive from a Carrier**

## 6-4 Installing Graphics (GPU) Cards

The system supports three graphics processor unit (GPU) cards, which are mounted in brackets to fit into the PCIe slots at the front of the chassis.

The GPU cards may be preinstalled. Use the procedure below if a GPU card must be replaced. See the NVIDIA web site for more details on the GPU specifications.

***Installing Graphics Cards***

1. Identify the left and right brackets and graphics cards as illustrated below.

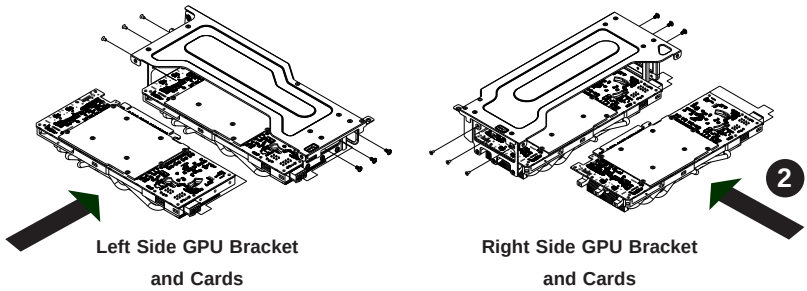



**Figure 6-4. Installing GPU Cards into the Left and Right GPU Brackets**

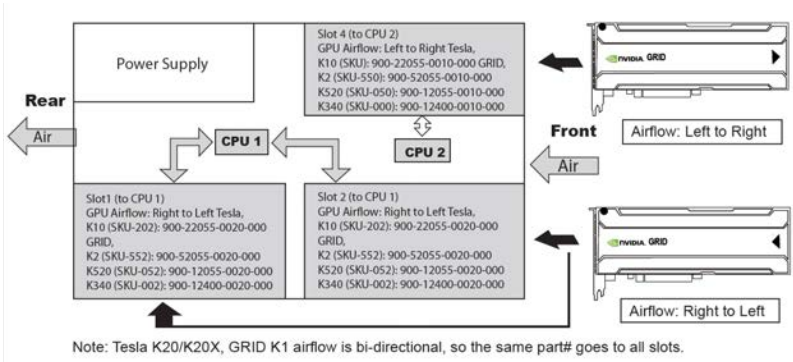



**Figure 6-5. GPU Airflow Block Diagram**

2. Insert the graphics cards into the brackets, aligning the mounting holes in the cards with those in the brackets, as in Figure 6-4. The NVIDIA universal bracket (MCP-240-11803-0N) which supports all NVIDIA GPU cards.

3. Secure each card to the bracket using the screws that are included for this purpose. Keplers: Remove the bracket on the end of the GPU, add a washer (included in kit) between the plate and the PCB for each screw, then attach the GPU to the bracket.

4. Carefullly position each bracket in the chassis as illustrated, aligning the four mounting holes in the top and side of each bracket with the corresponding mounting holes in the chassis. Pay attention to the airflow arrows to install each card into the correct side of the chassis

5. Secure the bracket to the chassis by using the screws provided.

6. After a GPU card is installed, you must connect it to one of the following power headers on the serverboard: JPW3, JPW4, JPW6, JPW7, JPW8 or JPW11.

**Important Note for Kepler GPUs:** Note the airflow arrows on top of the GPU card. The card with the arrow pointing toward the Tesla logo, right to left airflow, should go on the left side of the chassis, and the card with the arrow pointing away from the Tesla logo, left to right airflow, should go on the right side of the chassis (when viewed from the front of the system).

## 6-5 Installing Expansion Cards

The system accepts one low profile expansion card, mounted on a riser bracket.

***Installing an Expansion Card***

1. Locate the *riser card bracket* in your chassis accessory bag, and the riser card, which may be purchased separately.

2. Power down the system and remove the cover.

3. Remove the PCI slot shield in the rear of the chassis.

4. Attach the riser card to the riser card bracket using screws.

5. Insert the riser card into the motherboard expansion slot while aligning the riser card bracket with the rear of the chassis. Secure the bracket with screws.

6. Insert the expansion card into a slot on the riser card while aligning the expansion card backplate with the open slot in the rear of the chassis.

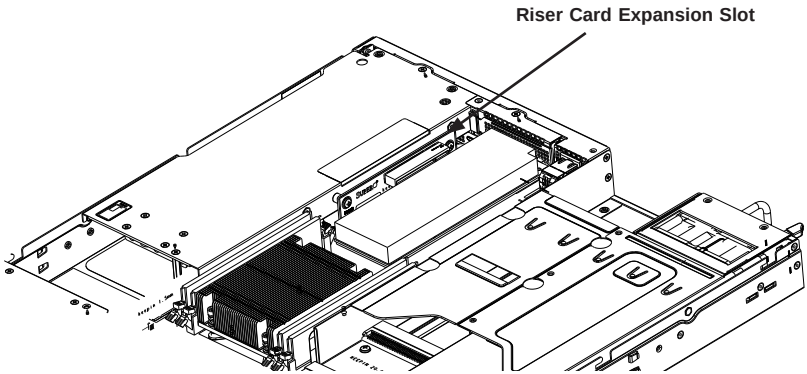



**Figure 6-6. Riser Card Bracket and Expansion Slot**

## 6-6 System Cooling

Ten 4-cm counter-rotating fans provide the cooling for the system. Each fan unit is actually made up of two fans joined back-to-back, which rotate in opposite directions. This counter-rotating action generates exceptional airflow and works to dampen vibration levels.

It is very important that the chassis top cover is properly installed and making a good seal in order for the cooling air to circulate properly through the chassis and cool the components.

### System Fan Failure

Fan speed is controlled by IPMI depending on the system temperature. If a fan fails, the remaining fans will ramp up to full speed. The system can continue to run with a failed fan. Replace any failed fan at your earliest convenience with the same model. Failed fans can be identified through the BIOS. The fan numbers are printed on the floor of the chassis.

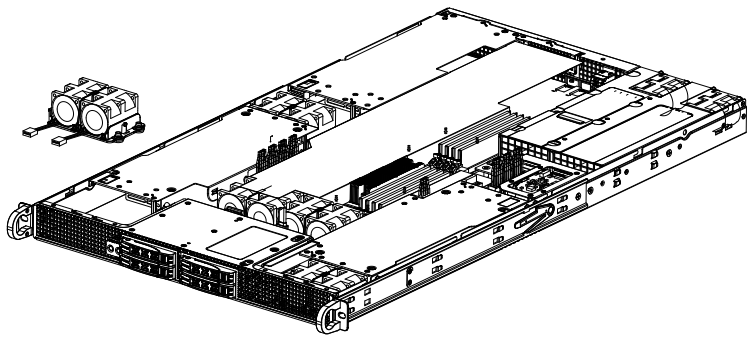


**Figure 6-7. Installing a Fan**

***Replacing a System Fan***

1. If you do not use the BIOS to determine which fan has failed, open the top cover of the chassis while the system is running to locate the position of the failed fan. Never run the server for an extended period of time with the top cover open.

2. Turn off the power to the system and unplug the AC power cord.

3. Remove the failed fan's wiring from the serverboard.

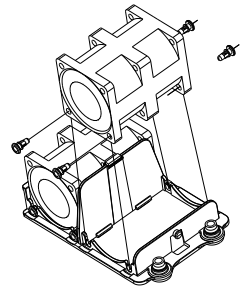


**Figure 6-8. Removing a Fan from the Fan Tray**

4. Remove the four pins securing the fan to the fan tray.

5. Lift the failed fan from the fan tray and out of the chassis.

6. Place the new fan into the vacant space in the fan tray, while making sure the arrows on the top of the fan (indicating air direction) point in the same direction as the arrows on the other fans in the same fan tray.

7. Reconnect the fan wires to the exact same chassis fan headers as the previous fan.

8. Reconnect the AC power cord, power up the system and check that the fan is working properly before replacing the chassis cover.

## Installing the Air Shroud

Air shrouds concentrate airflow to maximize fan efficiency. The SC118GH chassis has an air shroud for each GPU and one for the serverboard. The serverboard air shroud does not require screws to install.

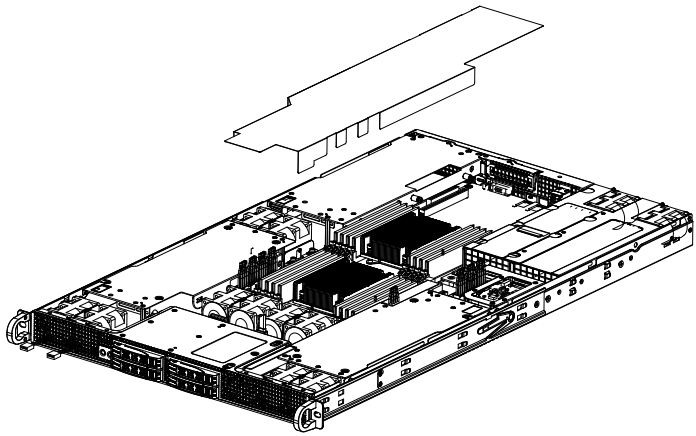


**Figure 6-9. Installing the Air Shroud**

***Installing the Air Shroud***

1. Position the air shroud in the chassis as illustrated in Figure 6-9.
2. Align the notch on the air shroud with the pin on the expansion card bracket.
3. Slide the pin into the back of the notch.
4. Lower the front of the air shroud over the fan tray, sliding the front notches over the pins on the fan tray.

## 6-7 Power Supply

The server includes two redundant 1600 watt power supply modules. They automatically sense the input voltage between 100v to 240v, and operate at that voltage. An amber light on the power supply is illuminated when the power is switched off. An green light indicates that the power supply is operating.

If either of the power supply modules fail, the other module will support the full load and allow the system to continue operation without interruption. The PWR Fail LED will illuminate and remain on until the failed unit has been replaced. Replace with the same model. Replacement units can be ordered directly from Supermicro.

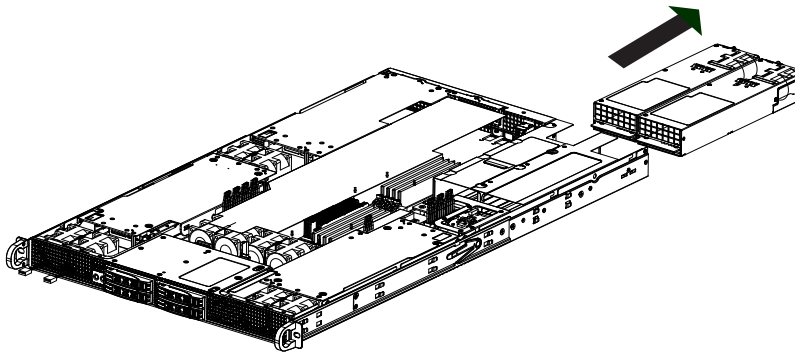


**Figure 6-10. Removing the Power Supply**

***Replacing the Power Supply***

1. Unplug the AC power cord from the failed power supply module.
2. Push in the locking tab at the back of the module to release it.
3. Pull the unit straight out of the chassis.
4. Carefully insert the new unit into position in the chassis, pushing it in until it clicks.
5. Reconnect the power cord.

## Notes

# Chapter 7

# BIOS

## 7-1 Introduction

This chapter describes the AMI BIOS setup utility for the X10DRG-H/HT. The ROM BIOS is stored in a Flash EEPROM and can be easily updated. This chapter describes the basic navigation of the AMI BIOS setup utility screens.

**Note:** For AMI BIOS recovery, please refer to the UEFI BIOS Recovery Instructions in Appendix C.

### Starting BIOS Setup Utility

To enter the AMI BIOS setup utility screens, press the <Delete> key while the system is booting up.

**Note**: In most cases, the <Delete> key is used to invoke the AMI BIOS setup screen.

Each main BIOS menu option is described in this manual. The AMI BIOS setup menu screen has two main frames. The left frame displays all the options that can be configured. Grayed-out options cannot be configured. Options in blue can be configured by the user. The right frame displays the key legend. Above the key legend is an area reserved for a text message. When an option is selected in the left frame, it is highlighted in white. Often a text message will accompany it.

**Note**: the AMI BIOS has default text messages built in. Supermicro retains the option to include, omit, or change any of these text messages.

The AMI BIOS setup utility uses a key-based navigation system called "hot keys." Most of the AMI BIOS setup utility "hot keys" can be used at any time during the setup navigation process. These keys include <F1>, <F4>, <Enter>, <Esc>, arrow keys, etc.

**Note**: Options printed in **Bold** are default settings.

### How To Change the Configuration Data

The configuration data that determines the system parameters may be changed by entering the AMI BIOS setup utility. This setup utility can be accessed by pressing <Del> at the appropriate time during system boot.

### How to Start the Setup Utility

Normally, the only visible Power-On Self-Test (POST) routine is the memory test. As the memory is being tested, press the <Delete> key to enter the main menu of the AMI BIOS setup utility. From the main menu, you can access the other setup screens. An AMI BIOS identification string is displayed at the left bottom corner of the screen, below the copyright message.

**Warning:** Do not upgrade the BIOS unless your system has a BIOS-related issue. Flashing the wrong BIOS can cause irreparable damage to the system. In no event shall Supermicro be liable for direct, indirect, special, incidental, or consequential damages arising from a BIOS update. If you have to update the BIOS, do not shut down or reset the system while the BIOS is updating to avoid possible boot failure.

## 7-2 Main Setup

When you first enter the AMI BIOS setup utility, you will enter the Main setup screen. You can always return to the Main setup screen by selecting the Main tab on the top of the screen. The Main BIOS setup screen is shown below.

The following Main menu items will be displayed:

**System Date/System Time**

Use this option to change the system date and time. Highlight *System Date* or *System Time* using the arrow keys. Enter new values using the keyboard. Press the <Tab> key or the arrow keys to move between fields. The date must be entered in Day MM/DD/YYYY format. The time is entered in HH:MM:SS format.

> **Note:** The time is in the 24-hour format. For example, 5:30 P.M. appears as 17:30:00.

**Supermicro X10DRG**

**BIOS Version:** This item displays the version of the BIOS ROM used in the system.

**Build Date:** This item displays the date when the version of the BIOS ROM used in the system was built.

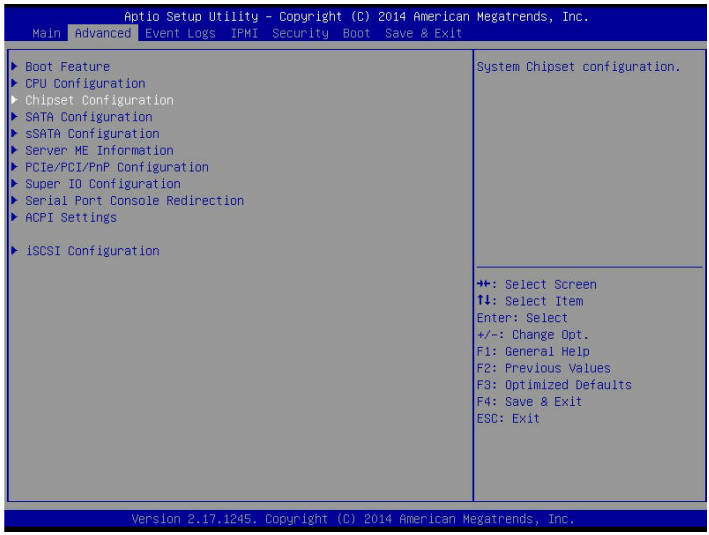
**Memory Information**

**Total Memory:** This item displays the total size of memory available in the system.

**Memory Speed:** This item displays the default speed of the memory modules installed in the system.

## 7-3 Advanced Setup Configurations

Use the arrow keys to select Advanced setup and press <Enter> to access the submenu items:




**Caution**: Take Caution when changing the Advanced settings. An incorrect value, a very high DRAM frequency or an incorrect BIOS timing setting may cause the system to malfunction. When this occurs, restore the setting to the manufacture default setting.

### ▶Boot Feature

#### Quiet Boot

Use this feature to select the screen display between POST messages or the OEM logo at bootup. Select Disabled to display the POST messages. Select Enabled to display the OEM logo instead of the normal POST messages. The options are **Enabled** and Disabled.

#### AddOn ROM Display Mode

Use this item to set the display mode for the Option ROM. Select Keep Current to use the current AddOn ROM display setting. Select Force BIOS to use the Option ROM display mode set by the system BIOS. The options are **Force BIOS** and Keep Current.

#### Bootup Num-Lock State

Use this feature to set the Power-on state for the Numlock key. The options are Off and **On**.

**Wait For 'F1' If Error**

Select Enabled to force the system to wait until the 'F1' key is pressed if an error occurs. The options are Disabled and **Enabled**.

**INT19 (Interrupt 19) Trap Response**

Interrupt 19 is the software interrupt that handles the boot disk function. When this item is set to Immediate, the ROM BIOS of the host adaptors will "capture" Interrupt 19 at bootup immediately and allow the drives that are attached to these host adaptors to function as bootable disks. If this item is set to Postponed, the ROM BIOS of the host adaptors will not capture Interrupt 19 immediately and allow the drives attached to these adaptors to function as bootable devices at bootup. The options are **Immediate** and Postponed.

**Re-try Boot**

When EFI Boot is selected, the system BIOS will automatically reboot the system from an EFI boot device after its initial boot failure. Select Legacy Boot to allow the BIOS to automatically reboot the system from a Legacy boot device after its initial boot failure. The options are **Disabled**, Legacy Boot, and EFI Boot.

## Power Configuration

**Watch Dog Function**

Select Enabled to allow the Watch Dog timer to reboot the system when it is inactive for more than 5 minutes. The options are Enabled and **Disabled.**

**Power Button Function**

This feature controls how the system shuts down when the power button is pressed. Select 4 Seconds Override for the user to power off the system after pressing and holding the power button for 4 seconds or longer. Select Instant Off to instantly power off the system as soon as the user presses the power button. The options are 4 Seconds Override and **Instant Off.**

**Restore on AC Power Loss**

Use this feature to set the power state after a power outage. Select Power-Off for the system power to remain off after a power loss. Select Power-On for the system power to be turned on after a power loss. Select Last State to allow the system to resume its last power state before a power loss. The options are Power-On, Stay-Off and **Last State**.

## ▶CPU Configuration

This submenu displays the following CPU information as detected by the BIOS. It also allows the user to configure CPU settings.

- Processor Socket
- Processor ID
- Processor Frequency
- Processor Max Ratio
- Processor Min Ratio
- Microcode Revision
- L1 Cache RAM
- L2 Cache RAM
- L3 Cache RAM
- Processor 0 Version
- Processor 1 Version

**Clock Spread Spectrum**

Select Enable to allow the BIOS to monitor and attempt to reduce the level of Electromagnetic Interference caused by the components whenever needed. The options are **Disable** and Enable.

**Hyper-Threading (All)**

Select Enable to support Intel's Hyper-threading Technology to enhance CPU performance. The options are **Enable** and Disable.

**Cores Enabled**

This feature allows the user to set the number of CPU cores to enable. Enter "0" to enable all cores. The default setting is **0**.

**Execute-Disable Bit (Available if supported by the OS & the CPU)**

Select Enable for Execute Disable Bit Technology support, which will allow the processor to designate areas in the system memory where an application code can execute and where it cannot, thus preventing a worm or a virus from flooding illegal

codes to overwhelm the processor to damage the system during an attack. This feature is used in conjunction with the items: "Clear MCA," "VMX," "Enable SMX," and "Lock Chipset" for Virtualization media support. The options are **Enable** and Disable. (Refer to Intel and Microsoft websites for more information.)

**PPIN Control**

Select Unlock/Enable to use the Protected-Processor Inventory Number (PPIN) in the system. The options are **Unlock/Enable** and Unlock/Disable.

**Hardware Prefetcher (Available when supported by the CPU)**

If set to Enable, the hardware prefetcher will prefetch streams of data and instructions from the main memory to the L2 cache to improve CPU performance. The options are Disable and **Enable**.

**Adjacent Cache Prefetch (Available when supported by the CPU)**

Select Enable for the CPU to prefetch both cache lines for 128 bytes as comprised. Select Disable for the CPU to prefetch both cache lines for 64 bytes. The options are Disable and **Enable**.

> **Note**: Please reboot the system for changes on this setting to take effect. Please refer to Intel's website for detailed information.

**DCU (Data Cache Unit) Streamer Prefetcher (Available when supported by the CPU)**

If set to Enable, the DCU Streamer Prefetcher will prefetch data streams from the cache memory to the DCU (Data Cache Unit) to speed up data accessing and processing to enhance CPU performance. The options are Disable and **Enable**.

**DCU IP Prefetcher**

If set to Enable, the IP prefetcher in the DCU (Data Cache Unit) will prefetch IP addresses to improve network connectivity and system performance. The options are **Enable** and Disable.

**Direct Cache Access (DCA)**

Select Enable to use Intel DCA (Direct Cache Access) Technology to improve the efficiency of data transferring and accessing. The options are **Auto**, Enable, and Disable.

**X2APIC (Advanced Programmable Interrupt Controller)**

Based on Intel's Hyper-Threading architecture, each logical processor (thread) is assigned 256 APIC IDs (APIDs) in 8-bit bandwidth. When this feature is set to Enable, the APIC ID will be expanded from 8 bits (X2) to 16 bits to provide 512 APIDs to each thread to enhance CPU performance. The options are **Disable** and Enable.

**AES-NI**

Select Enable to use the Intel Advanced Encryption Standard (AES) New Instructions (NI) to ensure data security. The options are Enable and **Disable**.

**Intel Virtualization Technology**

Select Enable to use Intel Virtualization Technology support for Direct I/O VT-d support by reporting the I/O device assignments to the VMM (Virtual Machine Monitor) through the DMAR ACPI tables. This feature offers fully-protected I/O resource sharing across Intel platforms, providing greater reliability, security and availability in networking and data-sharing. The options are **Enable** and Disable.

## ▶Chipset Configuration

**Warning!** Please set the correct settings for the items below. A wrong configuration setting may cause the system to malfunction.

## ▶North Bridge

This feature allows the user to configure the settings for the Intel North Bridge.

## ▶IIO Configuration

**EV DFX (Device Function On-Hide) Feature**

When this feature is set to Enable, the EV_DFX Lock Bits that are located on a processor will always remain clear during electric tuning. The options are **Disable** and Enable.

## ▶IIO1 Configuration

**IIO2 (IOU PCIe Port1)**

This item configures the PCI-E port Bifuraction setting for a PCI-E port specified by the user. The options are x4x4, x8, and **Auto**.

**IIO0 (IOU PCIe Port2)**

This item configures the PCI-E port Bifuraction setting for a PCI-E port specified by the user. The options are x4x4x4x4, x4x4x8, x8x4x4, x8x8, x16, and **Auto**.

**IIO 1 (IOU PCIe Port3)**

This item configures the PCI-E port Bifuraction setting for a PCI-E port specified by the user. The options are x4x4x4x4, x4x4x8, x8x4x4, x8x8, x16, and **Auto**.

**No PCIe Port Active ECO**

This item provides a workaround solution when there is no PCIe port active. The options are Reset the SQ FLOP by CSR Option and **PCU Squelch Exit Ignore Option**.

## ▶Socket 0 PCIED00F0 Port 0/DMI

This submenu allows the user to configure the settings for the following PCI-E prots: 0, 1A, 1B, 2A, 2B, 2C, 2D, 3A, 3B, 3C, and 3D.

**Link Speed**

Use this item to configure the link speed of a PCI-E device installed on the PCI-E slot specified by the user. The options are Gen1, Gen2, and **Gen3**.

**PCI-E Port DeEmphasis**

DeEmphasis is used to decrease the magnitude of very high frequencies in relation to the magnitude of very low frequencies to improve the overall signal-to-noise ratio by reducing the level of all (signals) data bits transmitted except the first one, acting as a form of transmitter equalization to enhance signal transmission and audio performance. The options are -3.5 dB and **-6.0 dB**.

**PCI-E Port L0s Exit Latency**

Use this item to configure the exit latency of the PCI-E port L0s link state, measuring the length of time needed to transition from the L0s link state to L0. The available latency option is 4uS - 8uS. (Note: "uS" is a stand-in for "microseconds.")

**PCI-E Port L1 Exit Latency**

Use this item to configure the exit latency of the PCI-E port L1 link state, measuring the length of time needed to transition from the L1 link state to L0. The latency options are <1uS, 1uS - 2uS, 2uS - 4uS, 4uS - 8uS, **8uS - 16uS**, 16uS - 32uS, 32uS - 64uS, >64uS. (Note: "uS" is a stand-in for "microseconds.")

**Fatal Err Over (Fatal Error Overwrite)**

This item configures the option to overwrite fatal errors. The options are **Disable** and Enable.

**Non-Fatal Err Over (Non-Fatal Error Overwrite)**

This item configures the option to overwrite non-fatal errors. The options are **Disable** and Enable.

**Corr Err Over (Correctable Error Overwrite)**

This item configures the option to overwrite correctable errors for ECC memory. The options are **Disable** and Enable.

**L0s Support**

This item configures the option to enable support for the L0s PCI-E link state (non supported in this motherboard). The only available option is **Disable**.

## ▶IOAT (Intel® IO Acceleration) Configuration

**Enable IOAT**

Select Enable to enable Intel I/OAT (I/O Acceleration Technology) support, which will significantly reduce CPU overhead by leveraging CPU architectural improvements and freeing the system resource for other tasks. The options are **Enable** and Disable.

**No Snoop**

Select Enable to support no-snoop mode for each CB device. The options are **Disable** and Enable.

**Relaxed Ordering**

Select Enable to enable Relaxed Ordering support which will allow certain transactions to violate the strict-ordering rules of PCI bus for a transaction to be completed prior to other transactions that have already been enqueued earlier. The options are **Disable** and Enable.

## ▶ Intel VT for Directed I/O (VT-d)

**Intel VT for Direct I/O (VT-d)**

Select Enable to use Intel Virtualization Technology support for Direct I/O VT-d support by reporting the I/O device assignments to the VMM (Virtual Machine Monitor) through the DMAR ACPI Tables. This feature offers fully-protected I/O resource sharing across Intel platforms, providing greater reliability, security and availability in networking and data-sharing. The options are **Enable** and Disable.

**Interrupt Remapping**

Select Enable for Interrupt Remapping support to enhance system performance. The options are **Enable** and Disable.

## ▶QPI (Quick Path Interconnect) Configuration

### ▶QPI General Configuration

#### QPI Status

The following information will display:

- Number of CPU
- Number of IIO
- Current QPI Link Speed
- Current QPI Link Frequency
- QPI Global MMIO Low Base/Limit
- QPI Global MMIO High Base/Limit
- QPI PCIe Configuration Base/Size

**Link Frequency Select**

Use this item to select the desired frequency for QPI Link connections. The options are 6.4GB/s, 8.0GB/s, 9.6GB/s, **Auto,** and Auto Limited.

**Link L0p Enable**

Select Enable for Link L0p support. The options are **Enable** and Disable.

**Link L1 Enable**

Select Enable for Link L1 support. The options are **Enable** and Disable.

**COD Enable (Available when the OS and the CPU support this feature)**

Select Enabled for Cluster-On-Die support to enhance system performance in cloud computing. The options are Enable and **Disable**.

**Early Snoop (Available when the OS and the CPU support this feature)**

Select Enable for Early Snoop support to enhance system performance. The options are Enable, Disable, and **Auto**.

**Isoc Mode**

Select Enable for Isochronous support to meet QoS (Quality of Service) requirements. This feature is especially important for Virtualization Technology. The options are Enable and **Disable**.

## ▶Memory Configuration

**Enforce POR**

Select Enable to enforce POR restrictions on memory frequency and voltage programming. The options are **Enabled** and Disabled.

**Memory Frequency**

Use this feature to set the maximum memory frequency for onboard memory modules. The options are **Auto**, 1333, 1400, 1600, 1800, 1867, 2000, 2133, 2200, 2400, 2600, 2667, 2800, 2993, 3000, 3200 and Reserved (Do not select Reserved).

**Data Scrambling**

Select Enabled to enable data scrambling to enhance system performance and data integrity. The options are **Auto**, Disabled, and Enabled.

**DRAM RAPL (Running Average Power Limit) Baseline**

Use this feature to set the run-time power-limit baseline for the DRAM modules. The options are Disable, DRAM RAPL Mode 0, and **DRAM RAPL Mode 1**.

**Set Throttling Mode**

Throttling improves reliability and reduces power consumption in processors via automatic voltage control during processor idle states. The options are Disabled and **CLTT** (Closed Loop Thermal Throttling).

**Socket Interleave Below 4GB**

Select Enabled for the memory above the 4G Address space to be split between two sockets. The options are Enable and **Disable**.

**A7 Mode**

Select Enabled to support the A7 (Addressing) mode to improve memory performance. The options are **Enable** and Disable.

## ▶DIMM Information

This item displays the status of a DIMM module as detected by the BIOS.

P1-DIMMA1/A2, P1-DIMMB1/B2, P1-DIMMC1/C2, P1-DIMMD1/D2, P2-DIMME1/E2, P2-DIMMF1/F2, P2-DIMMG1/G2, and P2-DIMMH1/H2

## ▶Memory RAS (Reliability_Availability_Serviceability) Configuration

Use this submenu to configure the following Memory RAS settings.

**RAS Mode**

When Disable is selected, RAS is not supported. When Mirror is selected, the motherboard maintains two identical copies of all data in memory for data backup. When Lockstep is selected, the motherboard uses two areas of memory to run the same set of operations in parallel to boost performance. The options are **Disable**, Mirror, and Lockstep Mode.

**Memory Rank Sparing**

Select Enable to enable memory-sparing support for memory ranks to improve memory performance. The options are **Disabled** and Enabled.

**Patrol Scrub**

Patrol Scrubbing is a process that allows the CPU to correct correctable memory errors detected on a memory module and send the correction to the requestor (the original source). When this item is set to Enable, the PCH (Platform Control Hub) will read and write-back one cache line every 16K cycles if there is no delay caused by internal processing. By using this method, roughly 64 GB of memory behind the PCH will be scrubbed every day. The options are **Enable** and Disable.

**Patrol Scrub Interval**

This feature allows you to decide how many hours the system should wait before the next complete patrol scrub is performed. Use the keyboard to enter a value from 0-24. The Default setting is **24**.

**Demand Scrub**

Demand Scrubbing is a process that allows the CPU to correct correctable memory errors found on a memory module. When the CPU or I/O issues a demand-read command, and the read data from memory turns out to be a correctable error, the error is corrected and sent to the requestor (the original source). Memory is updated as well. Select Enable to use Demand Scrubbing for ECC memory correction. The options are **Enable** and Disable.

**Device Tagging**

Select Enable to support device tagging. The options are **Disable** and Enable.

## ▶South Bridge Configuration

The following South Bridge information will display:

## ▶USB Configuration

- USB Module Version
- USB Devices

**Legacy USB Support**

Select Enabled to support onboard legacy USB devices. Select Auto to disable legacy support if there are no legacy USB devices present. Select Disable to have all USB devices available for EFI applications only. The options are **Enabled,** Disabled, and Auto.

**XHCI (Extensible Host Controller Interface) Hand-Off**

This is a work-around solution for operating systems that do not support XHCI (Extensible Host Controller Interface) hand-off. The XHCI ownership change should be claimed by the XHCI driver. The settings are **Enabled** and Disabled.

**EHCI (Enhanced Host Controller Interface) Hand-Off**

This item is for operating systems that do not support Enhanced Host Controller Interface (EHCI) hand-off. When this item is enabled, EHCI ownership change will be claimed by the EHCI driver. The settings are Enabled and **Disabled**.

**Port 60/64 Emulation**

Select Enabled for I/O port 60h/64h emulation support, which in turn, will provide complete legacy USB keyboard support for the operating systems that do not support legacy USB devices. The options are Disabled and **Enabled**.

**USB 3.0 Support**

Select Enabled for USB 3.0 support. The options are Smart Auto, Auto, Enabled, **Disabled**, and Manual.

**EHCI1**

Select Enabled to enable EHCI (Enhanced Host Controller Interface) support on USB 2.0 connector #1 (-at least one USB 2.0 connector should be enabled for EHCI support.) The options are Disabled and **Enabled**.

**EHCI2**

Select Enabled to enable EHCI (Enhanced Host Controller Interface) support on USB 2.0 connector #2 (-at least one USB 2.0 connector should be enabled for EHCI support.) The options are Disabled and **Enabled**.

## ▶SATA Configuration

When this submenu is selected, AMI BIOS automatically detects the presence of the SATA devices that are supported by the Intel PCH chip and displays the following items:

**SATA Controller**

This item enables or disables the onboard SATA controller supported by the Intel PCH chip. The options are **Enabled** and Disabled.

**Configure SATA as**

Select IDE to configure a SATA drive specified by the user as an IDE drive. Select AHCI to configure a SATA drive specified by the user as an AHCI drive. Select RAID to configure a SATA drive specified by the user as a RAID drive. The options are IDE, **AHCI**, and RAID.

**If the item above "Configure SATA as" is set to AHCI, the following items will display:*

**Support Aggressive Link Power Management**

When this item is set to Enabled, the SATA AHCI controller manages the power usage of the SATA link. The controller will put the link to a low power state when the I/O is inactive for an extended period of time, and the power state will return to normal when the I/O becomes active. The options are **Enabled** and Disabled.

**SATA Port 0~ Port 5**

This item displays the information detected on the installed SATA drive on the particular SATA port.

- Model number of drive and capacity
- Software Preserve Support

**Port 0 ~ Port 5**

Select Enabled to enable a SATA port specified by the user. The options are Disabled and Enabled.

**Port 0 ~ Port 5 Spin Up Device**

On an edge detect from 0 to 1, set this item to allow the PCH to initialize the device. The options are Enabled and **Disabled**.

**Port 0 ~ Port 5 SATA Device Type**

Use this item to specify if the SATA port specified by the user should be connected to a Solid State drive or a Hard Disk Drive. The options are **Hard Disk Drive** and Solid State Drive.

**If the item above "Configure SATA as" is set to IDE, the following items will display:*

**Serial ATA Port 0 ~ Port 5**

This item indicates that a SATA port specified by the user is installed (present) or not.

**Port 0 ~ Port 5 SATA Device Type (Available when a SATA port is detected)**

Use this item to specify if the SATA port specified by the user should be connected to a Solid State drive or a Hard Disk Drive. The options are **Hard Disk Drive** and Solid State Drive.

**If the item above "Configure SATA as" is set to RAID, the following items will display:*

**Support Aggressive Link Power Management**

When this item is set to Enabled, the SATA AHCI controller manages the power usage of the SATA link. The controller will put the link to a low power state when the I/O is inactive for an extended period of time, and the power state will return to normal when the I/O becomes active. The options are **Enabled** and Disabled.

**SATA RAID Option ROM/UEFI Driver**

Select EFI to load the EFI driver for system boot. Select Legacy to load a legacy driver for system boot. The options are Disabled, EFI, and **Legacy**.

**SATA/sSATA RAID Boot Select**

Select SATA Controller to boot the system from a SATA RAID device. Select sSATA Controller to boot the system from a S-SATA RAID device. Select Both to boot the system either from a SATA RAID device or from an sSATA RAID device. Please note that the option-Both is not supported by the Windows Server 2012/R2 OS. The options are None, Both, SATA Controller, and **sSATA Controller**.

**Serial ATA Port 0 ~ Port 5**

This item displays the information detected on the installed SATA drives on the particular SATA port.

- Model number of drive and capacity
- Software Preserve Support

**Port 0 ~ Port 5**

Select Enabled to enable a SATA port specified by the user. The options are Disabled and **Enabled**.

**Port 0 ~ Port 5 Spin Up Device**

On an edge detect from 0 to 1, set this item to allow the PCH to start a COMRESET initialization to the device. The options are Enabled and **Disabled**.

**Port 0 ~ Port 5 SATA Device Type**

Use this item to specify if the SATA port specified by the user should be connected to a Solid State drive or a Hard Disk Drive. The options are **Hard Disk Drive** and Solid State Drive.

## ▶sSATA Configuration

When this submenu is selected, AMI BIOS automatically detects the presence of the SATA devices that are supported by the PCH-sSATA controller and displays the following items:

**sSATA Controller**

This item enables or disables the onboard SATA controller supported by the Intel PCH-sSATA controller. The options are **Enabled** and Disabled.

**Configure sSATA as**

Select IDE to configure an sSATA drive specified by the user as an IDE drive. Select AHCI to configure an sSATA drive specified by the user as an AHCI drive. Select RAID to configure an sSATA drive specified by the user as a RAID drive. The options are IDE, **AHCI**, and RAID.

**If the item above "Configure sSATA as" is set to AHCI, the following items will display:*

**Support Aggressive Link Power Management**

When this item is set to Enabled, the SATA AHCI controller manages the power usage of the SATA link. The controller will put the link to a low power state when the I/O is inactive for an extended period of time, and the power state will return to normal when the I/O becomes active. The options are **Enabled** and Disabled.

**sSATA Port 0 ~ Port 3**

This item displays the information detected on the installed on the sSATA port. specified by the user.

- Model number of drive and capacity
- Software Preserve Support

**sSATA Port 0 ~ Port 3 Spin Up Device**

On an edge detect from 0 to 1, set this item to allow the PCH to start a COMRESET initialization to the device. The options are Enabled and **Disabled**.

**Port 0 ~ Port 3 sSATA Device Type**

Use this item to specify if the sSATA port specified by the user should be connected to a Solid State drive or a Hard Disk Drive. The options are **Hard Disk Drive** and Solid State Drive.

**If the item above "Configure sSATA as" is set to IDE, the following items will display:*

**sSATA Port 0 ~ Port 3**

This item indicates that an sSATA port specified by the user is installed (present) or not.

**Port 0 ~ Port 3 sSATA Device Type (Available when a SATA port is detected)**

Use this item to specify if the sSATA port specified by the user should be connected to a Solid State drive or a Hard Disk Drive. The options are **Hard Disk Drive** and Solid State Drive.

**If the item above "Configure sSATA as" is set to RAID, the following items will display:*

**Support Aggressive Link Power Management**

When this item is set to Enabled, the SATA AHCI controller manages the power usage of the SATA link. The controller will put the link to a low power state when the I/O is inactive for an extended period of time, and the power state will return to normal when the I/O becomes active. The options are **Enabled** and Disabled.

**sSATA RAID Option ROM/UEFI Driver**

Select EFI to load the EFI driver for system boot. Select Legacy to load a legacy driver for system boot. The options are Disabled, EFI, and **Legacy**.

**SATA/**s**SATA RAID Boot Select**

Select SATA Controller to use a device supported by the SATA connector for system boot. Select sSATA Controller to use a device supported by the sSATA connector for system boot. The options are None, SATA Controller, **sSATA Controller**, and Both.

**sSATA Port 0 ~ Port 3**

This item displays the information detected on the installed sSATA drives on the particular sSATA port.

- Model number of drive and capacity
- Software Preserve Support

**sSATA Port 0 ~ Port 3**

Select Enabled to enable an sSATA port specified by the user. The options are Disabled and Enabled.

**sSATA Port 0 ~ Port 3 Spin Up Device**

On an edge detect from 0 to 1, set this item to allow the PCH to start a COMRESET initialization to the device. The options are Enabled and **Disabled**.

**Port 0 ~ Port 3 sSATA Device Type**

Use this item to specify if the sSATA port specified by the user should be connected to a Solid State drive or a Hard Disk Drive. The options are **Hard Disk Drive** and Solid State Drive.

## ▶Server ME (Management Engine) Configuration

This feature displays the following system ME configuration settings.

- General ME Configuration
- Operational Firmware Version
- Recovery Firmware Version
- ME Firmware Features
- ME Firmware Status #1
- ME Firmware Status #2
  - Current State
  - Error Code

## ▶PCIe/PCI/PnP Configuration

**PCI Devices Common Settings**

**PCI Latency Timer**

Select Enabled to set the latency timer for PCI. The options are **32 PCI Bus Clocks**, 64 PCI Bus Clocks, 96 PCI Bus Clocks, 128 PCI Bus Clocks, 160 PCI Bus Clocks, 192 PCI Bus Clocks, 224 PCI Bus Clocks, and 248 PCI Bus Clocks.

**PERR# Generation**

Select Enabled to support PERR (PCI/PCI-E Parity Error)/SERR (System Error) runtime error reporting for a PCI/PCI-E slot. The options are Enabled and **Disabled**.

**SERR# Generation**

Select Enabled to support PERR (PCI/PCI-E Parity Error)/SERR (System Error) runtime error reporting for a PCI/PCI-E slot. The options are Enabled and **Disabled**.

**PCI PERR/SERR Support**

Select Enabled to support PERR (PCI/PCI-E Parity Error)/SERR (System Error) runtime error reporting for a PCI/PCI-E slot. The options are Enabled and **Disabled**.

**Above 4G Decoding (Available if the system supports 64-bit PCI decoding)**

Select Enabled to decode a PCI device that supports 64-bit in the space above 4G Address. The options are **Enabled** and Disabled.

**SR-IOV (Available if the system supports Single-Root Virtualization)**

Select Enabled for Single-Root IO Virtualization support. The options are Enabled and **Disabled.**

**Maximum Payload**

Select Auto for the system BIOS to automatically set the maximum payload value for a PCI-E device to enhance system performance. The options are **Auto**, 128 Bytes, and 256 Bytes.

**Maximum Read Request**

Select Auto for the system BIOS to automatically set the maximum size for a read request for a PCI-E device to enhance system performance. The options are **Auto**, 128 Bytes, 256 Bytes, 512 Bytes, 1024 Bytes, 2048 Bytes, and 4096 Bytes.

**ASPM Support**

Use this item to set the Active State Power Management (ASPM) level for a PCI-E device. Select Auto for the system BIOS to automatically set the ASPM level based on the system configuration. Select Disabled to disable ASPM support. The options are **Disabled** and Auto.

**Warning**: Enabling ASPM support may cause some PCI-E devices to fail!

**MMIOHBase**

Use this item to select the base memory size according to memory-address mapping for the PCH. The base memory size must be between 4032G to 4078G. The options are **56T**, 48T, 24T, 2T, 512G, and 256G.

**MMIO High Size**

Use this item to select the high memory size according to memory-address mapping for the PCH. The options are **256G**, 128G, 512G, and 1024G.

**PCI Device Option ROM Setting**

**CPU1 Slot 1 PCI-E x16 OPROM (Option ROM)**

Select Enabled to enable Option ROM support to boot the computer using a device installed on slot 1. The options are Disabled, Legacy, and **EFI**.

**CPU1 Slot 2 PCI-E x16 OPROM (Option ROM)**

Select Enabled to enable Option ROM support to boot the computer using a device installed on slot 2. The options are Disabled, **Legacy**, and EFI.

**CPU1 Slot 3 PCI-E x16 OPROM (Option ROM)**

Select Enabled to enable Option ROM support to boot the computer using a device installed on slot 3. The options are Disabled, **Legacy**, and EFI.

**CPU1 Slot 4 PCI-E x16 OPROM (Option ROM)**

Select Enabled to enable Option ROM support to boot the computer using a device installed on slot 4. The options are Disabled, **Legacy**, and EFI.

**CPU1 Slot 5 PCI-E x16 OPROM (Option ROM)**

Select Enabled to enable Option ROM support to boot the computer using a device installed on slot 5. The options are Disabled, **Legacy**, and EFI.

**Onboard Video OPROM (Option ROM)**

Select Enabled to enable Option ROM support to boot the computer using a device installed on the slot specified by the user. The options are DISABLED, **Legacy**, and EFI.

**VGA Priority**

Use this item to select the graphics device to be used as the primary video display for system boot. The options are **Onboard** and Offboard.

**Onboard LAN Option ROM Type**

Select Legacy to boot the computer using a Legacy device installed on the motherboard. The options are **Legacy** and EFI.

**Onboard LAN1 Option ROM/Onboard LAN2 Option ROM**

Use this option to select the type of device installed in LAN Port1, LAN Port2 or the onboard video device used for system boot. The options for LAN1 Option ROM are **PXE**, iSCSI, and Disabled, and the options for LAN2 Option ROM are PXE and **Disabled**. The other options are iSCSI and Disabled.

**Network Stack**

Select Enabled to enable PXE (Preboot Execution Environment) or UEFI (Unified Extensible Firmware Interface) for network stack support. The options are Enabled and **Disabled**.

## ▶Super IO Configuration

**Super IO Chip AST2400**

**▶Serial Port 1 Configuration/Serial Port 2 Configuration**

**Serial Port**

Select Enabled to enable the onboard serial port specified by the user. The options are **Enabled** and Disabled.

**Change Port 1 Settings/Change Port 2 Settings**

This feature specifies the base I/O port address and the Interrupt Request address of Serial Port 1 or Serial Port 2. Select **Auto** for the BIOS to automatically assign the base I/O and IRQ address to a serial port specified.

The options for Serial Port 1 are **Auto**, (IO=3F8h; IRQ=4), (IO=3F8h; IRQ=3, 4, 5, 6, 7, 10, 11, 12), (IO=2F8h; IRQ=3, 4, 5, 6, 7, 10, 11, 12); (IO=3E8h; IRQ=3, 4, 5, 6, 7, 10, 11, 12), and (IO=2E8h; IRQ=3, 4, 5, 6, 7, 10, 11, 12).

The options for Serial Port 2 are **Auto**, (IO=2F8h; IRQ=3), (IO=3F8h; IRQ=3, 4, 5, 6, 7, 10, 11, 12), (IO=2F8h; IRQ=3, 4, 5, 6, 7, 10, 11, 12); (IO=3E8h; IRQ=3, 4, 5, 6, 7, 10, 11, 12), and (IO=2E8h; IRQ=3, 4, 5, 6, 7,10, 11, 12).

**Serial Port 2 Attribute**

Select SOL to use COM Port 2 as a Serial_Over_LAN (SOL) port for console redirection. The options are COM and **SOL**.

## ▶Serial Port Console Redirection

**COM 1**

**COM 1 Console Redirection**

Select Enabled to enable COM Port 1 Console Redirection, which will allow a client machine to be connected to a host machine at a remote site for networking. The options are **Disabled** and Enabled.

**If the item above set to Enabled, the following items will become available for configuration:*

### ▶COM1 Console Redirection Settings

**Terminal Type**

This feature allows the user to select the target terminal emulation type for Console Redirection. Select VT100 to use the ASCII Character set. Select VT100+ to add color and function key support. Select ANSI to use the Extended ASCII Character Set. Select VT-UTF8 to use UTF8 encoding to map Unicode characters into one or more bytes. The options are ANSI, VT100, **VT100+**, and VT-UTF8.

**Bits per second**

Use this item to set the transmission speed for a serial port used in Console Redirection. Make sure that the same speed is used in the host computer and the client computer. A lower transmission speed may be required for long and busy lines. The options are 9600, 19200, 38400, 57600, and **115200** (bits per second).

**Data Bits**

Use this feature to set the data transmission size for Console Redirection. The options are 7 (Bits) and **8 (Bits)**.

**Parity**

A parity bit can be sent along with regular data bits to detect data transmission errors. Select Even if the parity bit is set to 0, and the number of 1's in data bits is even. Select Odd if the parity bit is set to 0, and the number of 1's in data bits is odd. Select None if you do not want to send a parity bit with your data bits in transmission. Select Mark to add a mark as a parity bit to be sent along with

the data bits. Select Space to add a Space as a parity bit to be sent with your data bits. The options are **None**, Even, Odd, Mark, and Space.

**Stop Bits**

A stop bit indicates the end of a serial data packet. Select 1 Stop Bit for standard serial data communication. Select 2 Stop Bits if slower devices are used. The options are **1** and 2.

**Flow Control**

Use this item to set the flow control for Console Redirection to prevent data loss caused by buffer overflow. Send a "Stop" signal to stop sending data when the receiving buffer is full. Send a "Start" signal to start sending data when the receiving buffer is empty. The options are **None** and Hardware RTS/CTS.

**VT-UTF8 Combo Key Support**

Select Enabled to enable VT-UTF8 Combination Key support for ANSI/VT100 terminals. The options are **Enabled** and Disabled**.**

**Recorder Mode**

Select Enabled to capture the data displayed on a terminal and send it as text messages to a remote server. The options are **Disabled** and Enabled.

**Resolution 100x31**

Select Enabled for extended-terminal resolution support. The options are Disabled and **Enabled**.

**Legacy OS Redirection Resolution**

Use this item to select the number of rows and columns used in Console Redirection for legacy OS support. The options are 80x24 and **80x25**.

**Putty KeyPad**

This feature selects Function Keys and KeyPad settings for Putty, which is a terminal emulator designed for the Windows OS. The options are **VT100**, LINUX, XTERMR6, SCO, ESCN, and VT400.

**Redirection After BIOS Post**

Use this feature to enable or disable legacy Console Redirection after BIOS POST. When the option BootLoader is selected, legacy Console Redirection is disabled before booting the OS. When Always Enable is selected, legacy Console Redirection remains enabled upon OS bootup. The options are **Always Enable** and BootLoader.

**SOL/COM2 Console Redirection**

**SOL/COM2 Console Redirection**

Select Enabled to use the SOL/COM2 port for Console Redirection. The options are **Enabled** and Disabled.

**If the item above set to Enabled, the following items will become available for user's configuration:*

## ▶SOL/COM2 Console Redirection Settings

Use this feature to specify how the host computer will exchange data with the client computer, which is the remote computer used by the user.

**Terminal Type**

Use this feature to select the target terminal emulation type for Console Redirection. Select VT100 to use the ASCII Character set. Select VT100+ to add color and function key support. Select ANSI to use the Extended ASCII Character Set. Select VT-UTF8 to use UTF8 encoding to map Unicode characters into one or more bytes. The options are ANSI, VT100, **VT100+**, and VT-UTF8.

**Bits Per second**

Use this feature to set the transmission speed for a serial port used in Console Redirection. Make sure that the same speed is used in the host computer and the client computer. A lower transmission speed may be required for long and busy lines. The options are 9600, 19200, 38400, 57600, and **115200** (bits per second).

**Data Bits**

Use this feature to set the data transmission size for Console Redirection. The options are 7 (Bits) and **8 (Bits)**.

**Parity**

A parity bit can be sent along with regular data bits to detect data transmission errors. Select Even if the parity bit is set to 0, and the number of 1's in data bits is even. Select Odd if the parity bit is set to 0, and the number of 1's in data bits is odd. Select None if you do not want to send a parity bit with your data bits in transmission. Select Mark to add a mark as a parity bit to be sent along with the data bits. Select Space to add a Space as a parity bit to be sent with your data bits. The options are **None**, Even, Odd, Mark, and Space.

**Stop Bits**

A stop bit indicates the end of a serial data packet. Select 1 Stop Bit for standard serial data communication. Select 2 Stop Bits if slower devices are used. The options are **1** and 2.

**Flow Control**

Use this feature to set the flow control for Console Redirection to prevent data loss caused by buffer overflow. Send a "Stop" signal to stop sending data when the receiving buffer is full. Send a "Start" signal to start data-sending when the receiving buffer is empty. The options are **None** and Hardware RTS/CTS.

**VT-UTF8 Combo Key Support**

Select Enabled to enable VT-UTF8 Combination Key support for ANSI/VT100 terminals. The options are **Enabled** and Disabled**.**

**Recorder Mode**

Select Enabled to capture the data displayed on a terminal and send it as text messages to a remote server. The options are **Disabled** and Enabled.

**Resolution 100x31**

Select Enabled for extended-terminal resolution support. The options are Disabled and **Enabled**.

**Legacy OS Redirection Resolution**

Use this feature to select the number of rows and columns used in Console Redirection for legacy OS support. The options are 80x24 and **80x25**.

**Putty KeyPad**

This feature selects Function Keys and KeyPad settings for Putty, which is a terminal emulator designed for the Windows OS. The options are **VT100**, LINUX, XTERMR6, SCO, ESCN, and VT400.

**Redirection After BIOS Post**

Use this feature to enable or disable legacy Console Redirection after BIOS POST (Power-On Self-Test). When this feature is set to BootLoader, legacy Console Redirection is disabled before booting the OS. When this feature is set to Always Enable, legacy Console Redirection remains enabled upon OS boot. The options are **Always Enable** and BootLoader.

## ▶Legacy Console Redirection Settings

**Legacy Serial Redirection Port**

Use this item to configure redirection for legacy serial ports. The options are **COM1** and SOL/COM2.

## ▶Serial Port for Out-of-Band Management / Windows Emergency Management Services (EMS)

The submenu allows the user to configure Console Redirection settings to support Out-of-Band Serial Port management.

**Console Redirection**

Select Enabled to use a COM port selected by the user for EMS Console Redirection. The options are Enabled and **Disabled.**

**If the item above set to Enabled, the following items will become available for user's configuration:*

## ▶EMS Console Redirection Settings (Available when EMS Console Redirection is enabled)

Use this feature to specify how the host computer will exchange data with the client computer, which is the remote computer used by the user.

**Out-of-Band Management Port**

The feature selects a serial port in a client server to be used by the Windows Emergency Management Services (EMS) to communicate with a remote host server. The options are **COM1 (Console Redirection)** and SOL (Console Redirection)/COM2.

**Terminal Type**

Use this feature to select the target terminal emulation type for Console Redirection. Select VT100 to use the ASCII character set. Select VT100+ to add color and function key support. Select ANSI to use the extended ASCII character set. Select VT-UTF8 to use UTF8 encoding to map Unicode characters into one or more bytes. The options are ANSI, VT100, VT100+, and **VT-UTF8**.

**Bits per second**

This item sets the transmission speed for a serial port used in Console Redirection. Make sure that the same speed is used in both host computer and the client computer. A lower transmission speed may be required for long and busy lines. The options are 9600, 19200, 57600, and **115200** (bits per second).

**Flow Control**

Use this item to set the flow control for Console Redirection to prevent data loss caused by buffer overflow. Send a "Stop" signal to stop data-sending when the receiving buffer is full. Send a "Start" signal to start data-sending when the receiving buffer is empty. The options are **None,** Hardware RTS/CTS, and Software Xon/Xoff.

The setting for each of the following features is displayed:

**Data Bits, Parity, Stop Bits**

## ▶Trusted Computing (Available when a TPM device is installed and detected by the BIOS)

**Configuration**

**Security Device Support**

If this feature and the TPM jumper on the motherboard are both set to Enabled, onboard security devices will be enabled for TPM (Trusted Platform Module) support to enhance data integrity and network security. Please reboot the system for a change on this setting to take effect. The options are Enabled and **Disabled**.

**TPM State**

Select Enabled to use TPM (Trusted Platform Module) settings to enhance system data security. Please reboot your system for any change on the TPM state to take effect. The options are Disabled and **Enabled**.

**Pending Operation**

Use this item to schedule a TPM-related operation to be performed by a security device for system data integrity. Your system will reboot to carry out a pending TPM operation. The options are **0**, Enable Take Ownership, Disable Take Ownership, and TPM Clear.

**Note**: Your system will reboot to carry out a pending TPM operation.

**Current Status Information**

This item displays the status of the TPM support on this motherboard.

## ▶ACPI Settings

**WHEA Support**

Select Enabled to support the Windows Hardware Error Architecture (WHEA) platform and provide a common infrastructure for the system to handle hardware errors within the Windows OS environment to reduce system crashes and to enhance system recovery and health monitoring. The options are **Enabled** and Disabled.

**High Precision Timer**

Select Enabled to activate the High Precision Event Timer (HPET) that produces periodic interrupts at a much higher frequency than a Real-time Clock (RTC) does in synchronizing multimedia streams, providing smooth playback and reducing the de-

pendency on other timestamp calculation devices, such as an x86 RDTSC Instruction embedded in the CPU. The High Performance Event Timer is used to replace the 8254 Programmable Interval Timer. The options are **Enabled** and Disabled.

**NUMA (Available when the OS supports this feature)**

Select Enabled to enable Non-Uniform Memory Access support to enhance system performance. The options are **Enabled** and Disabled.

**PCI AER (Advanced Error-RepoArting) Support**

Select Enabled to support Advanced Error-Reporting for onboard PCI devices. The options are **Disabled** and Enabled.

## ▶iSCSI Configuration

This item displays iSCSI configuration information:

**iSCSI Initiator Name**

This item displays the name of the iSCSI Initiator, which is a unique name used in the world. The name must use the IQN format. The following actions can also be performed:

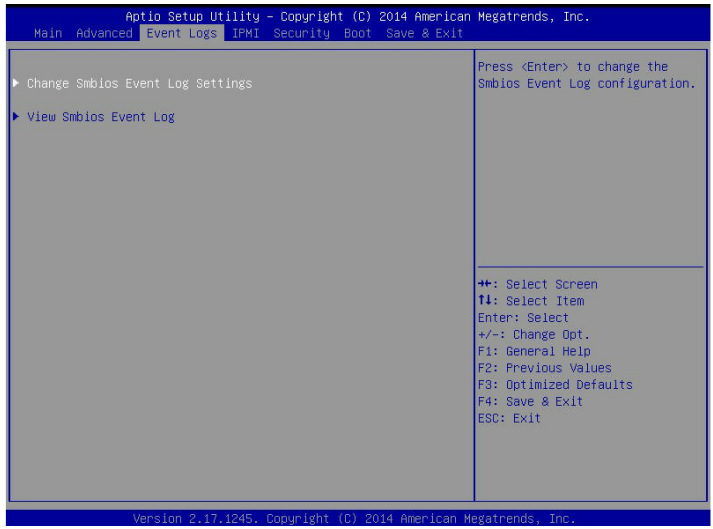
**▶Add an Attempt**

**▶Delete Attempts**

**▶Change Attempt Order**

# 7-4 Event Logs

Use this feature to configure Event Log settings.




## ▶Change SMBIOS Event Log Settings

This feature allows the user to configure SMBIOS Event settings.

### Enabling/Disabling Options

### SMBIOS Event Log

Select Enabled to enable SMBIOS (System Management BIOS) Event Logging during system boot. The options are **Enabled** and Disabled.

### Runtime Error Logging Support

Select Enable to support Runtime Error Logging. The options are **Enable** and Disable. If this item is set to Enable, the following item will be available for configuration:

### Memory Corrected Error Enabling (Available when the item above-Runtime Error Logging Support is set to Enable)

Select Enable for the BIOS to correct a memory error if it is correctable. The options are **Enable** and Disable.

### PCI-Ex (PCI-Express) Error Enable

Select Yes for the BIOS to correct errors occurred in the PCI-E slots. The options are Yes and **No**.

**Memory Correctable Error Threshold**

Use this item to enter the threshold value for correctable memory errors. The default setting is **10**.

**Erasing Settings**

**Erase Event Log**

Select Enabled to erase all error events in the SMBIOS (System Management BIOS) log before an event logging is initialized at bootup. The options are **No** and Yes.

**When Log is Full**

Select Erase Immediately to immediately erase all errors in the SMBIOS event log when the event log is full. Select Do Nothing for the system to do nothing when the SMBIOS event log is full. The options are **Do Nothing** and Erase Immediately.

**SMBIOS Event Log Standard Settings**

**Log System Boot Event**

Select Enabled to log system boot events. The options are **Disabled** and Enabled.

**MECI (Multiple Event Count Increment)**

Enter the increment value for the multiple event counter. Enter a number between 1 to 255. The default setting is **1**.

**METW (Multiple Event Count Time Window)**

This item is used to determine how long (in minutes) should the multiple event counter wait before generating a new event log. Enter a number between 0 to 99. The default setting is **60**.

**Note**: Please reboot the system for the changes to take effect.

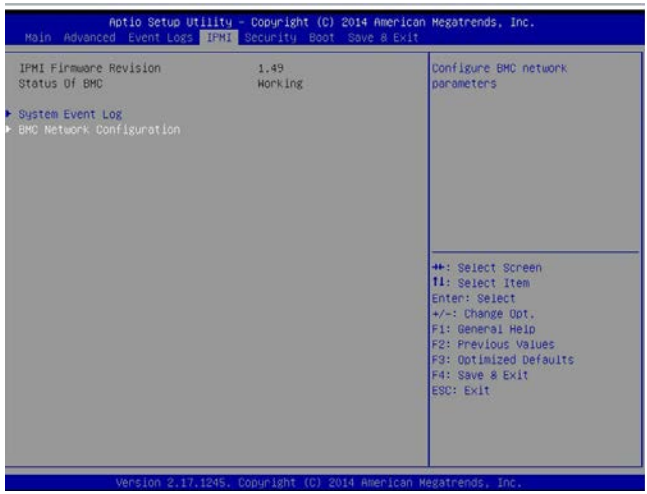
## ▶View SMBIOS Event Log

This item allows the user to view the event in the SMBIOS event log. Select this item and press <Enter> to view the status of an event in the log. The following categories are displayed:

**Date/Time/Error Code/Severity**

## 7-5 IPMI

Use this feature to configure Intelligent Platform Management Interface (IPMI) settings.




**IPMI Firmware Revision**

This item indicates the IPMI firmware revision used in your system.

**Status of BMC**

This item indicates the status of the onboard BMC (Baseboard Management Controller).

### ▶System Event Log

**Enabling/Disabling Options**

**SEL Components**

Select Enabled to enable all system event logging support at bootup. The options are **Enabled** and Disabled.

**Erasing Settings**

**Erase SEL**

Select Yes, On next reset to erase all system event logs upon next system reboot. Select Yes, On every reset to erase all system event logs upon each system reboot. Select No to keep all system event logs after each system reboot. The options are **No,** Yes, On next reset, and Yes, On every reset.

**When SEL is Full**

This feature allows the user to determine what the AMI BIOS should do when the system event log is full. Select Erase Immediately to erase all events in the log when the system event log is full. The options are **Do Nothing** and Erase Immediately.

> **Note**: After making changes on a setting, be sure to reboot the system for the changes to take effect.

## ▶BMC Network Configuration

The following items will be displayed:

**Update IPMI LAN Configuration**

Select Yes for the system BIOS to automatically reset the following IPMI settings at next system boot. The options are Yes and **No**.

**Configuration Address Source (Available when the item above - Update IPMI LAN Configuration is set to Yes)**

Use this item to select the IP address source for this computer. If Static is selected, you will need to know the IP address of this computer and enter it to the system manually in the field. If DHCP is selected, AMI BIOS will search for a DHCP (Dynamic Host Configuration Protocol) server attached to the network and request the next available IP address for this computer. The options are **DHCP**, and Static.

**Station IP Address**

This item displays the Station IP address for this computer. This should be in decimal and in dotted quad form (i.e., 192.168.10.253).

**Subnet Mask**

This item displays the sub-network that this computer belongs to. The value of each three-digit number is separated by dots and it should not exceed 255.

**Station MAC Address**

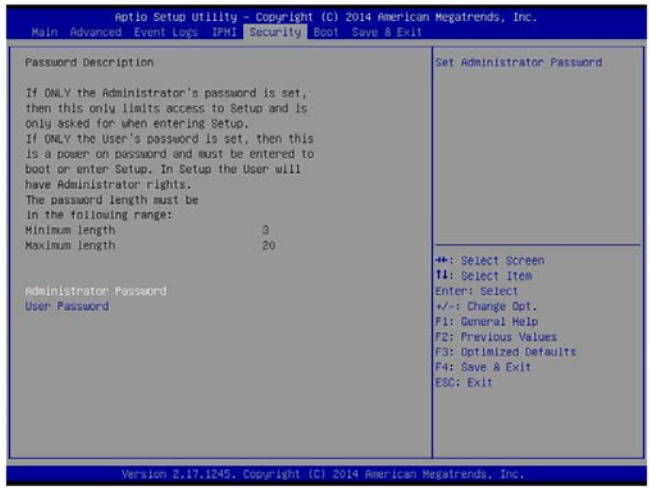
This item displays the Station MAC address for this computer. Mac addresses are 6 two-digit hexadecimal numbers.

**Gateway IP Address**

This item displays the Gateway IP address for this computer. This should be in decimal and in dotted quad form (i.e., 192.168.10.253).

## 7-6 Security Settings

This menu allows the user to configure the following security settings for the system.




**Administrator Password**

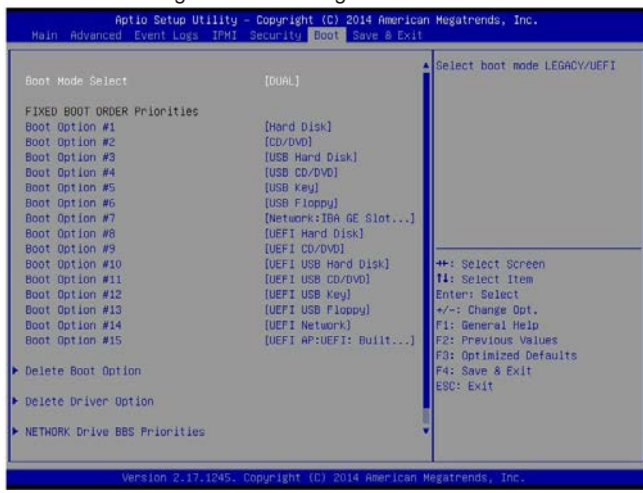
Use this feature to set the administrator password which is required before the user entering the BIOS setup utility. The length of the password should be from 3 characters to 20 characters long.

**User Password**

Use this feature to set the user password which is required to enter the BIOS setup utility. The length of the password should be from 3 characters to 20 characters long.

# 7-7 Boot Settings

Use this feature to configure Boot Settings:




## Boot Configuration

### Boot Mode Select

Use this item to select the type of device to be used for system boot. The options are Legacy, UEFI, and **Dual.**

### Fixed Boot Order Priorities

This option prioritizes the order of bootable devices from which the system will boot. Press <Enter> on each entry from top to bottom to select devices.

- Dual Boot Order #1
- Dual Boot Order #2
- Dual Boot Order #3
- Dual Boot Order #4
- Dual Boot Order #5
- Dual Boot Order #6
- Dual Boot Order #7
- Dual Boot Order #8

- Dual Boot Order #9
- Dual Boot Order #10
- Dual Boot Order #11
- Dual Boot Order #12
- Dual Boot Order #13
- Dual Boot Order #14
- Dual Boot Order #15

**▶Add New Boot Option**

Use this item to select a new boot device to add to the boot priority list.

**Add Boot Option**

Select the target boot device to add to the boot priority list.

**Path for Boot Option**

Select the device path (-the file system) for the new boot device to use.

**Create**

After selecting a boot device to add and the path for this new device, choose this feature and click OK to add the new device to the boot priority list.

**▶Delete Boot Option**

Use this item to select a boot device to delete from the boot priority list.

**Delete Boot Option**

Select the target boot device to delete.

**▶Delete Driver Option**

Use this item to select a driver specified by the user to delete from the boot priority list.

**Delete Driver Option**

Select the target driver to delete.

**▶Network Drive BBS Priorities**

- Boot Order #1

- Boot Order #2

**▶Network Drive BBS Priorities**

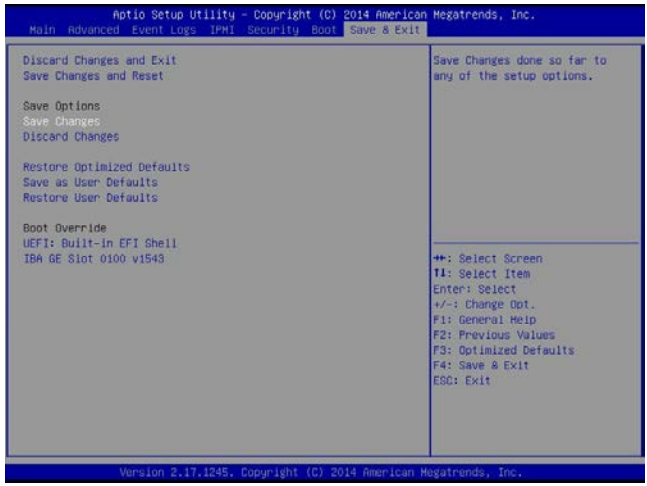
- Boot Order #1

**▶UEFI Application Boot Priorities**

- UEFI Boot Order #1

## 7-8 Save & Exit

Select the Save & Exit tab from the BIOS setup screen to configure the settings below.




**Discard Changes and Exit**

Select this option to quit the BIOS setup without making any permanent changes to the system configuration, and reboot the computer. Select Discard Changes and Exit from the Exit menu and press <Enter>.

**Save Changes and Reset**

When you have completed the system configuration changes, select this option to leave the BIOS setup utility and reboot the computer for the new system configuration parameters to take effect. Select Save Changes and Exit from the Exit menu and press <Enter>.

**Save Options**

**Save Changes**

When you have completed the system configuration changes, select this option to save all changes made. This will not reset (reboot) the system.

**Discard Changes**

Select this option and press <Enter> to discard all the changes and return to the AMI BIOS setup utility.

**Restore Optimized Defaults**

To set this feature, select Restore Optimized Defaults from the Exit menu and press <Enter>. These are manufacture default settings designed for maximum system performance but not for maximum stability.

**Save as User Defaults**

To set this feature, select Save as User Defaults from the Exit menu and press <Enter>. This enables the user to save any changes to the BIOS setup for future use.

**Restore User Defaults**

To set this feature, select Restore User Defaults from the Exit menu and press <Enter>. Use this feature to retrieve user-defined settings that were previously saved.

**Boot Override**

This feature allows the user to override the Boot priorities sequence in the Boot menu, and immediately boot the system with another device specified by the user. This is a one-time override.

## Notes

# Appendix A

# BIOS Error Beep Codes

During the Power-On Self-Test (POST) routines, which are performed at each system boot, errors may occur.

**Non-fatal errors** are those which, in most cases, allow the system to continue to boot. The error messages normally appear on the screen.

**Fatal errors** will not allow the system to continue with bootup procedure. If a fatal error occurs, you should consult with your system manufacturer for possible repairs.

These fatal errors are usually communicated through a series of audible beeps. The numbers on the fatal error list correspond to the number of beeps for the corresponding error.

| BIOS Error Beep Codes | | |
|---|---|---|
| **Beep Code/LED** | **Error Message** | **Description** |
| 1 beep | Refresh | Ready to boot |
| 5 short beeps + 1 long beep | Memory error | No memory detected in the system |
| 5 beeps | No Con-In or No Con-Out devices | Con-In: USB or PS/2 keyboard, PCI or Serial Console Redirection, IPMI KVM or SOL<br><br>Con-Out: Video Controller, PCI or Serial Console Redirection, IPMI SOL |
| 1 beep per device | Refresh | 1 beep for each USB device |
| **X10 IPMI Error Codes** | | |
| 1 Continuous Beep | System OH | System Overheat |

## Notes

# Appendix B

# System Specifications

### Processors

Dual Intel E5-2600v3 Series Processors (Socket R3) LGA 2011. Each processor supports dual full-width Intel QuickPath Interconnect (QPI) links of up to 9.6 GT/s one direction per QPI. For a complete listing of supported processors, refer to the Supermicro web site.

### Chipset

Intel PCH C612

### BIOS

128Mb SPI AMI BIOS® SM Flash UEFI BIOS

### Memory Capacity

The serverboard supports up to 1TB of 288-pin Registered (RDIMM)/Load Reduced (LRDIMM) DDR4 ECC 2133/1866/1600 MHz in 16 slots. Memory speed support is dependent on the CPUs. DIMM sizes up to 64GB @ 1.2V.

### SATA Controller

The serverboard supports a 10-port SATA 3.0 subsystem. RAID 0, 1, 5 and 10 can be enabled. The SATA drives are hot-swappable.

### Drive Bays

The chassis includes four 2.5" drive bays, which may be used to house hot-swappable SATA drives.

### Network

For 1028GR-TR, Intel i350 Gigabit (10/100/1000 Mb/s) Ethernet controller for LAN 1/LAN 2 ports.

For 1028GR-TRT, Intel X540 10_Gigabit Ethernet controller for LAN 1/LAN 2 ports.

For both, Aspeed 2400 Base-board Controller (BMC) supports IPMI_LAN 2.0.

### Expansion Slots

The serverboard has four PCI-Express 3.0 x16 slots to support three double-width GPU cards. An additional slot supports one low profile PCI-Express 3.0 x8 (in x16 slot) card. Riser cards are used.

### Serverboard

X10DRG-H/HT (proprietary form factor)

Dimensions: 19.8" (L) x 9.2" (W) (503 mm x 234 mm)

### Chassis

SC118GH-R1K66B (1U rackmount)

Dimensions: (WxHxD) 17.2" x 1.7" x 30.6" (437 x 43 x 777 mm)

### System Cooling

Ten sets of 4-cm counter-rotating fans (fan speed controlled by IPMI)

### System Input Requirements

AC Input Voltage: 100-240 VAC

Rated Input Current: 1000W: 100-127V/12.9A, 1600W: 200-240V/9.5A

Rated Input Frequency: 50-60 Hz

### Power Supply

Rated Output Power: 1000W/1600W (Part# PWS-1K66P-1R)

Rated Output Voltages: 1000W: +12V (82A), +12Vsb (2A), 1600W: +12V (132A), +12Vsb (2A)

### Operating Environment

Operating Temperature: 10º to 35º C (50º to 95º F)

Non-Operating Temperature: -40º to 70º C (-40º to 158º F)

Operating Relative Humidity: 8% to 90% (non-condensing)

Non-Operating Relative Humidity: 5 to 95% (non-condensing)

## Regulatory Compliance

Electromagnetic Emissions: FCC Class A, EN 55022 Class A, EN 61000-3-2/-3-3, CISPR 22 Class A

Electromagnetic Immunity: EN 55024/CISPR 24, (EN 61000-4-2, EN 61000-4-3, EN 61000-4-4, EN 61000-4-5, EN 61000-4-6, EN 61000-4-8, EN 61000-4-11)

Safety: CSA/EN/IEC/UL 60950-1 Compliant, UL or CSA Listed (USA and Canada), CE Marking (Europe)

California Best Management Practices Regulations for Perchlorate Materials: This Perchlorate warning applies only to products containing CR (Manganese Dioxide) Lithium coin cells. “Perchlorate Material-special handling may apply. See www.dtsc.ca.gov/hazardouswaste/perchlorate”

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## Notes